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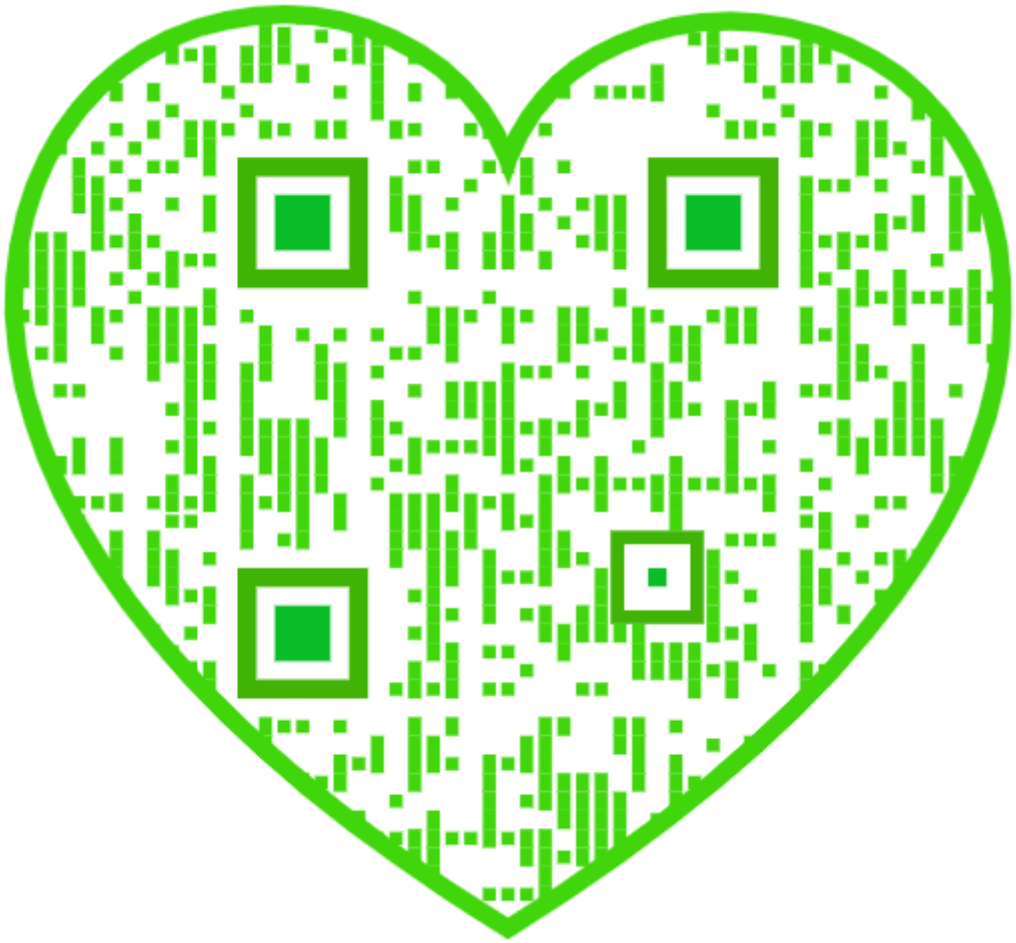
By

F. Maire

Formerly
Editor of

"Painting and Decorating"



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A PRACTICAL TREATISE ON

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INCLUDING

TOOLS AND MATERIALS EMPLOYED, PREPARATION OF SURFACES, STAINS AND STAINING, FILLERS AND FILLING, SHELLACKING, VARNISHES AND VARNISHING, RUBBING, POLISHING, FRENCH POLISHING, WAX POLISHING, OIL POLISHING, ETC., ETC.

Also a Full Description of the Woods Employed in Wood Finishing, their Treatment, and the Finishing of Floors.

By F. MAIRE,

Formerly Editor of "PAINTING AND DECORATING."

CHICAGO, U. S. A.
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PREFACE.

The subscriber wrote a series of articles on wood finishing in all its branches, which embodied his observations of the practice of the same in all the leading furniture factories and large paint shops in the country.

These articles appeared in *The Western Painter* in 1898 and the early part of 1899, and were well received by the trade. However, as from necessity, caused by want of time, they were hurriedly written and some parts not having received as much attention as they should, it was decided to rewrite these entirely, adding considerably to the text and illustrating the same wherever possible to do so to make it plainer and better understood as, for instance, in the appliances used in wood finishing.

While nearly every branch of "Painting" and "Paper Hanging" has been written upon and have had dozens of treatises published in handy book form, wood finishing has had but few exponents of the art in that form, therefore the conclusion come to to publish this in a handy volume for ready reference or consultation.

While it is not claimed that the practical, first-class wood finisher will receive very much addition to his store of knowledge by the perusal of the contents of this vol-

ume, yet the great majority of painters and contractors, who have not made that branch of the trade a specialty, will welcome it, will be interested, and, it is hoped, benefitted by adding it to their shop library.

From many letters received from practical painters, it is very evident that there exists a great deal of ignorance among the craft of the simplest principles of wood finishing, or else many queries would not have been made. To all such, and also for those who know but who forget and need a work of this kind as a manual of reference to brighten up the memory, this little volume is dedicated.

F. MAIRE.

Hamilton, Ill., Christmas, 1900.

CHAPTER I.

INTRODUCTION.

The employment of hardwoods in the interior construction of modern dwellings has become so common of late years, especially since the best quality of white pine has become both very scarce and dear and costs very nearly as much for finishing as many kinds of hardwood do, the only item of saving by using it being its greater ease of working by the joiner, so that there are few houses being constructed now, wherein hardwoods are not used at least for the so-called best rooms such as front and back parlors, library, sitting rooms, dining rooms, halls vestibules and stairways. In the better class of structures the whole house, including bed rooms, is now finished in hardwoods, cheaper varieties being used in the less pretentious parts.

This condition is one that has been created not only by Dame Fashion, but stern necessity has had and will have as much to do in keeping it up in the future as anything else, and such use is bound to become more and more universal. Those who are well posted upon the future of the lumber markets say that it does not require a man to be a prophet nor even the son of a prophet to predict what will be the outcome of the present extensive use of white pine in the near future. Our reserves are nearly gone and very little good old-fashioned No. 1 fin-

ishing lumber is to be found in our markets today. What will it be in twenty-five years?

It is therefore forced upon the house painters or house contractors that they should have a good, or at least a fair, knowledge of how hardwoods should be finished or else they must find themselves at a great disadvantage in the carrying on of their business.

Our large city paint shops usually have a separate department for this class of work; also a separate foreman in charge of it with frequently a separate set of workmen, who do nothing else but wood finishing. It is not, therefore, so much for their benefit that this treatise is written, but for the use of that vast multitude who cannot make a separate department of their wood finishing business and of that still larger class of painters residing in the smaller towns who usually are their own foremen and at times, at least, must be their own workmen, and at all times or places must be at least able to direct them.

All these must possess a personal knowledge of all the details pertaining to wood finishing to enable them to to know how to contract for this class of work at remunerative prices as well as to enable them to do the work in a manner that will be a credit to them as well as pleasing and acceptable to their customers or a supervising architect.

Hardwood finishing may be termed a new thing. At least, in so far as it is now performed it is rather of comparatively recent introduction. There is little or nothing,

therefore, to find relative to it in ancient literature. The little there is of it is so misleading as to be absolutely worthless, unless it be to trace the progress made of late years by this beautiful *art* (?)—pseudo art at least.

Why not an art? If to take a commonplace thing and by skill render it beautiful to look upon constitutes art in other lines, why not in this? A piece of wood finished in the highest degree of polish attainable is a thing of beauty, fully as much so as a great deal of the stuff that goes as art under the high-sounding name of water or oil colors, etchings, pastel work, etc., and is received and accepted under that name by a long-suffering public. Certainly the highly finished piece of hardwood has required as neat, as careful, and as dexterous handling to produce it, and in most cases as much intelligence, technical knowledge and love of the beautiful on the part of the producer as the average production of the so-called artist has.

But be that as it may, let the wood finisher be called an artist or an artisan, as said before wood finishing is rather of recent origin. Only a quarter of a century—twenty-five years—have elapsed since wood finishing has commenced to take its modern development. Previous to that date ordinary furniture was simply varnished with a cheap-made article and turned out in a still cheaper looking way. The medium grades were wax polished and the high priced were finished by the methods now usually known as French polishing. While it is true that by that processa very fine polish or finish is possible, nevertheless

the process is so tedious and expensive as to make it only within the reach of the rich, and the highly polished surfaces now better known as a piano finish, which has supplanted the French polish almost universally, has made it possible for even the very poor to have at least a few finely-finished hardwood specimens about their homes, and the great medium class of people, who are neither rich nor poor, can indulge their love of the beautiful to their hearts' content in a manner which even the rich would have thought extravagant in bygone days—not only indulging this love for the beauties of nature as developed in the endless variations of the different grains of the wood as enriched and brought out by the finisher in a few specimen articles of furniture, but in the whole woodwork of their dwellings, including wainscot, dadoes, ceilings, doors and casings, baseboards—all the woodwork in short.

This immense extension and addition made of the use of hardwoods has been made possible by the simplification of the processes used in bringing about the highly finished surfaces of the present at a comparatively low cost of production.

While it is true that fine furniture received as fine a polish as any that is produced today by French polishing, even this is of rather recent origin. Certainly not over one hundred and ten or fifteen years ago. It is within the memory of many of the older men yet living when French polishing began to be known to more than a very

few. In England and in America among artisans of English descent this finish was known and occasionally is still heard of under the name of "Vernis Martin" finish which translated would simply mean that it was finished with Martin's varnish, which may or may not have been correct—in fact was, and is now, incorrect as that firm has ceased to exist for many many years and varnished surfaces were never designated as "Vernis Martin finished" but only such as came under the designation of French polished, so that the terms are interchangeable and could be and are used to designate the same kind of finish.

Wood finishing may be said to have commenced a new era, when a finish was devised that in looks was about equal to French polish—in durability very nearly as good, and that could be finished in one-tenth part of the time. Nevertheless as there are to be found today a very few men who are willing to pay for and still demand this old-fashioned kind of a finish a special chapter has been added to describe the methods to produce French polish. It must be understood that in former times each individual considered himself sole keeper of every process used in wood finishing and kept his method secret, guarding them as closely as possible in order to keep them from becoming public property. Each step was a secret and not a few made good money by going around among the shops selling some of their secret recipes, usually under a rigorous oath of secrecy and for shop use only. Many got as much as $50 for such recipes and as it covered only a part

of the knowledge necessary, unless the rest was already mastered, it happened that several such outlays were necessary to equip one for the business. So that a wood finisher who was fully equipped to bring the wood to a perfect finish had quite a little capital invested in his knowledge, either as paid out in hard cash for his recipes or in some five to seven years of a rigorous apprenticeship served without pay or received as a legacy from father or relatives to whom he succeed in the business as heir.

The slowness and uncertainties of the old processes have about relegated them to oblivion and the younger wood finisher, who has learned the trade within the last two decades, can hardly realize that his knowledge is of so recent a date, and when he hears his elders talking over the past most of it sounds like Chinese to him and he only has looks of pity or commisseration to give them.

The above remarks giving a very brief review of the short past of wood finishing conclude all that will be said regarding the history of the trade. Life is too short and space too valuable to devote it to a retrospect that would not be of any use to the inquirer after practical knowledge.

As most processes in hardwood finishing are applicable with some few modifications to all kinds of wood, it has been thought best to consider them under a specific heading regardless of any particular kind of wood, so

that they will be brought up under the following general headings.

Sandpapering.
Staining and stains.
Filling and fillers.
Shellacking.
Varnishing.
Rubbing.
Polishing.
French Polishing.

First of all the various brushes, tools and appliances used in wood finishing will be treated of and illustrations consecutively numbered will be given so that it may help to obviate any misunderstanding of the descriptive text of such tools or appliances. When it may become necessary to make reference to any such tools in subsequent chapters, the number of the cut only need be given. This will prevent the reader from becoming mixed up.

After the general description of processes, a short description of the leading hardwoods used in wood finishing will be given. It will consist of a short sketch including the best methods to treat them, but how to proceed to execute them will be found only in the full description given under the special headings. The reader will do well to read and reread these, as it will save him many a misunderstanding afterward.

The line of demarkation between hardwoods and soft woods is an imaginary one, and of necessity it is made an

arbitrary one. It has become an almost universal custom to place all woods that are not white pine in the hardwood category, leaving only that under the appellation of soft wood. One may say that there is inconsistency in placing cottonwood, for instance, or bass in the hardwood line, but for a general treatment all these have certain peculiarities different from white pine, and as they are so little used in either furniture making or the construction of a house, this incongruous grouping may well be accepted without hurt therefrom.

The same may also be said of open-grained and close-grained woods. Some woods are neither one nor the other, and it would be very difficult to class them, if only two classes of treatment were considered. With general directions and the directions given under each wood to which, of course, the reader must add a good dose of common sense, there is no reason why even a novice may not be able to do a passable piece of work. In this instance the word passable is used purposely, as it is not to be supposed for a minute but that the novice will improve with his word as long probably as he lives—even should he practice daily to a good old age.

Many operations that are simple enough to either look at or understand the description of, such as flowing varnish, for instance, are a good deal easier understood than done. Practice will make a man perfect, and nothing else will.

White pine receives attention under a special head-

ing, as it is frequently finished in its natural color or stained, and on account of its easy working properties and of its cheapness in certain sections of the country, it is still extensively used, and while it lasts will be used until its complete extinction.

CHAPTER II.

GENERAL PRINCIPLES.

There are a few general principles which govern the finishing of all hardwoods that should be well understood before proceeding to the "*modus operandi.*" These principles are briefly laid down in the following paragraphs.

All kinds of woods are made up of fine thread-like filaments, or rather ligaments. When these ligaments are bundled together they form the trunk and limbs of trees. These thread-like ligaments are very fine in some woods while in others they are very coarse. When the former condition prevails the wood is said to be "*close grained;*" when, on the contrary, it is the latter that is the case, it is known as "*coarse grained;*" with any amount of variations between the extremes of each class or between the very coarsest and the very finest grained ones.

Again in some woods the ligaments lay together in a straight, close manner as would so many broomsticks bundled up; others are twisted in and out, seemingly crossing each other at all sorts of angles or running along in wave-like motions.

If in the former case the wood is sawn lengthwise in the usual fashion, it will be found that the alternate layers of ligaments and pores have a certain look of uniform-

ity and the wood is technically known as "*straight grained.*"

If the tangled or wavy-motioned grained wood is sawn in the same manner, the saw will have cut across both filaments and pores and the boards will present a beautifully variegated appearance. These variations make the beauty that distinguishes the various hardwoods and each has some of its own, which it is one of the purposes of wood finishing to develop, enrich and emphasize and to bring to view the most beautiful traits and characteristics.

The woods which are made up of a regular succession of filaments have a somewhat monotonous appearance, such as ash, chestnut, cypress, etc., excepting always, of course, where some obstacle has prevented the regular growth, as where it has been hindered by either knots, curves or natural bendings as where some other tree has fallen across it in the forest, or where it has been done artificially as is the case where timber is cultivated. If, forinstance, the body has been cut into, new layers of ligaments grow over the wounds and when these are severed by the saw the wood will show up a variegated or mottled surface entirely foreign to its ordinary appearance. A very noticeable instance of this is to be found in "Pollard Oak" but we see very little of this in America, as the practice of Pollardizing trees is almost unknown here and it is only in imported veneers that we ever get to see it here.

The fibres or ligaments that have not been severed

are hard, (varying with the different woods) form the light part of the woods, and are known technically as "lights." Even in the same woods the appearance of these lights varies very much according to whether they have been sawn in the usual way or whether the same have been "quarter sawn" as it is termed.

The spaces between the filaments are known as *pores*. It is through these that the sap flows, so that really pores are hollow conduits, which, when the wood has become throughly dried and freed from its liquid sap, will absorb *liquids*.

It must be apparent, then, to everyone that wood must be entirely free from sap or must have become thoroughly dried if a durable finish is to be expected, for if it has not, no matter how careful one may have been throughout the whole process of finishing, trouble will surely come and that before very long.

These pores, as one can readily see, vary very much in size according to the thickness of the fibres of the various woods. Now, if varnish be applied to the wood, no matter how carefully it may have been laid on, sandpapered or rubbed, it will be found to have sunk into the wood through the hollow conduits or pores. While a portion of the varnish has disappeared through these, there will be a fair portion of it that will adhere to the top as well as the sides of the fibres, presenting to the eye when dry, anything but a perfect level, but rather a succession of hills and valleys.

Subsequent coats of varnish applied over it and rubbed will hardly improve its appearance and will not level it. It is, of course, within the possibilities by giving a sufficient number of coats of varnish and of rubbing them down between each coat to finally bring the surface to a level, but such a way of obtaining it would be both slow and expensive.

It is a fact well worth remembering, and one of the fundamental first principles of wood finishing, that the less varnish applied to wood for the purpose for which it is used, *i.e.*, to give it a lustre, the more transparent and beautiful will the grain of the wood appear. Numerous coats of the most limpid varnish greatly affect, mar and detract from the clearness which the same wood would present had it been finished with only one or two coats instead—put on according to right methods over a proper preparation for it.

It will bear repeating even to a tedious degree that for good finishing only a minimum amount of varnish should be used; that the clearness and bright appearance of every detail of the wood is the brighter for a lesser amount of varnish; that if one coat will do this, it is folly to apply two to undo it. While one coat will not always do nor be sufficient to rub and polish, two will, and those who apply three and four to get a good polish have not attended to the perfect preparation of the wood to receive the varnish.

One may well and readily conjecture from the read-

there should be a perfectly level or filled-up surface (filling of the above that it is of the utmost importance that ing up of the pores) so that when the varnish is applied it will flow upon a perfect, glass-like surface. The surface must be not only perfectly level but in addition perfectly non-absorbent, for if it is not the object for which the filling has been done has failed of its object or rather of one of its objects, *i. e.*, to prevent the absorption of the varnish into the wood and to make it bear up instead.

It goes without the saying that this important operation is known under the name of "Filling." It will be treated at length under that heading, for it is absolutely indispensable that this operation be well understood and well performed to make a success of wood finishing.

It was seen that the wood should be well filled and leveled before varnish is applied to it, therefore it stands to reason that any change in the color of the wood that is to be finished must necessarily take place before the filling is performed.

As water stains are usually used in coloring woods, and as these open up the pores of the wood in such a way that it requires sandpapering to level it up again, it is absolutely necessary that it should take place before the filling. The relative merits of various methods of staining in either water, spirits or oil is not a question for us to consider now as this will receive attention under its proper heading; it is simply noted here that such an operation must take place previous to filling if done with water stains.

These few general principles constitute the ground work upon which wood finishing is built up. When one understands the nature of wood—of its component parts, he must see that the pores must be closed before any permanent polishing materials can be applied. He must also now understand that no varnish is so limpid but that it will become viscid if many coats are applied and mar the beautiful finish instead of helping it out.

Bearing these points in mind will enable one to comprehend nearly all other operations or processes that will be hereafter described. It will enable one to at least see the why and wherefore of most of them.

CHAPTER III.

TOOLS AND APPLIANCES USED IN WOOD FINISHING.

To do good work one must have suitable tools to do it with. There seems to be a diversity of opinion as to what are the best tools to use, and the same may be said concerning the brushes employed in wood finishing, as well as in every method of doing a given piece of work; and it is probable that no two manufacturers of furniture nor any two head finishers have exactly the same methods for doing a similar kind of finishing nor do they use the same tools. If this disagreement proves anything it is the fact that there is more in good workmanship than in the tools themselves, and that a man who has become an expert at handling a certain kind of tool, need not be in a hurry to give it up, simply because Mr. So and So tells him that he is behind the times in using what he says he would not have in his shop under any consideration.

It may be noticed daily in the furniture manufacturing sections, that there are men who do the best of finishing with tools that are condemned by others as worthless, so that the great amount of praise that is given by one man for a certain tool may be, after all, that it only has a fancied superiority over another.

Yet there are some tools that are better than others for doing certain kinds of work, and to give the reader a good idea of what he wants or needs to have for the finishing business is the purpose of this chapter.

The tools used in wood finishing are mainly "brushes" yet there a few articles and appliances that are indispensable to the finisher, and every shop should have a supply large or small according to the amount of work done, of the following, to wit:

Pulverized Pumice Stone—(Italian.)—Make sure of this, as the home article, which comes mainly from Utah, scratches and is not fit for good finishing. It comes in different degrees of fineness, the sizes mostly used in finishing being FF, F, 0, and 0½, FF being the finest.

Sandpaper—Use the best only. Some of the cheaper kinds have only one ply paper for a backing. As sandpaper has to be split occasionally this would be impossible with the cheap grades. Beside it cracks badly and has no elasticity. Sandpaper numbers most used are 0, ½, 1, and 1½, 0 being the finest named.

Rotten Stone—English—Pulverized and in brick form.

Tripoli and Polishing Powders.

Silex—finely pulverized—Light-colored for making a transparent filler; dark-colored where it is to be used in filling dark-colored or stained woods.

Curled Moss.

Horse Hair (curled) and Hair Cloth.

Excelsior shavings, and soft wood sawdust for cleaning off fillers.

Cotton waste for same purpose.

Hemp or flax tow, also for cleaning off fillers.

Chamois skins.

Old soft silk, cloth or handkerchiefs.

While it would seem that some of the above should have come in under the heading of "material" and would have been more appropriately mentioned and described there, yet in a way they partake of the nature of appliances used in preparing the wood for the finishing material that remains and becomes a part of the finish.

As it has been stated before, there are as many different views as to tools as there are finishers to express them. To note and describe each and every one would swell this chapter far beyond the limits intended for it, so only the most worthy of mention are noticed.

Among the appliances which are used in the making or the handling of water stains is the "vessel" which is to contain them. As the materials from which stains are usually made are either corrosive, acid or alkaline and seldom neutral, vessels made of iron and unprotected are forbidden for the purpose. Nothing better will be found for such a use than "porcelain lined" kettles or tanks. They can be readily cleaned, for their surfaces are as smooth as polished plate glass and a lot of valuable time will be saved in keeping them clean. Where the staining is done by dipping, porcelain lined tanks will also be

found the most effective for the same reasons as are stated above. The next best vessels made are "wooden" ones, that have been smoothly finished inside. The one greatest trouble with wooden vessels, however, is that they shrink when not constantly used, the consequence being that there is more or less trouble caused by leakage. Even when well made, if one will take into consideration the extra time needed in cleaning them and in keeping them in good condition for future use, they will be found fully as expensive as the porcelain-lined metal tanks. As the proper form to give these is a matter of fancy and convenience and as each one must settle for himself according to the size of the pieces he wishes to dip as to what is best for his use, no directions need be given further than what has already been said. There are many concerns in the market who make a good variety of small and large porcelain-lined tanks and who make any specially designed ones to order.

Rubbing Felt is another indispensable article much used by the wood finisher. There are many qualities of it made, some with a hard texture, others with a soft, with many variations between these extremes. The medium hard is what is mostly used. The sheets of felt vary in thickness from ¼ inch to 2 inches. The kinds mostly preferred by rubbers are one inch thick and upward, some using the two inch thickness exclusively. The felt is usually cut up into pieces 3x5 inches in width and length. There is a considerable difference in the

prices asked for felt. There is probably no article used in wood finishing that possesses greater adaptabilities for adulteration with as little chance of detection by either "the feel or the looks." It is always in order to feel suspicious, if it is offered at a price below what is asked for good qualities in the open market. It is all important that it should be uniform in texture throughout. If it be mixed with a cheaper material, it will surely wear unevenly and trouble is sure to come of it. In Fig. 1 is given an illustration of sheets of felt running from thick to thin.

Fig. 1—Rubbing Felt.

Scrapers.—Wide steel scrapers will be occasionally required to remove finished parts that for some reason or other have become blemished or any finish which for any reason has to be removed. Old steel blades from planes, socketed into wooden handles are frequently used for the purpose, and

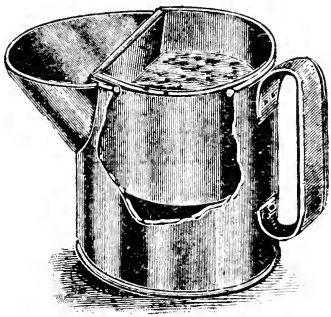

Fig. 2—Varnish Pot.

are home-made affairs, but are as good as any that could be bought. The shape of the handles may vary to suit the taste and fancy of the operator, and as he usually makes them himself, he knows much better how he wants them than anyone could possibly tell him.

Fig. 3—Strainer.

Tin pails, for holding oil stains and fillers to brush from are very convenient. One of about one-half a gallon capacity is the best size to use. It should have a handle soldered on the side to hold it by. A wire also should be soldered across the top to wipe the brush upon. It will be found much more convenient than the sides of the pail, and will save these from becoming smeared up both inside and outside.

Varnish pail or pot.—For holding varnish from which to work. The above described tin pail will answer fairly well, but the one illustrated in Fig. 2 will be much better. The cup holds about one pint, and sets in the pot. A lip is made on which to wipe the brush and the surplus varnish goes into the pot, thus allowing the brush to always be dipped into clean varnish. It is patented and

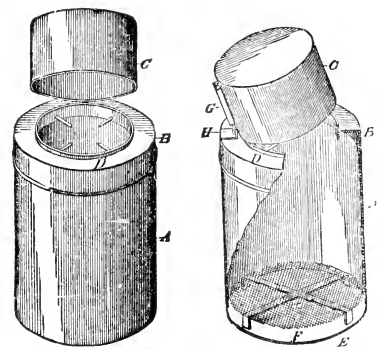

Fig. 4—Varnish Brush Keeper.

Fig. 5—Picking Stick.

for sale by all the first-class painters' supply stores.

Strainers, of various sizes and shapes, made from heavy tin with copper wire bottoms, are necessary to insure uniformity and freedom from specks in water or oil stains. No particular shape is required. Consult your own convenience and particular needs. Many tin shops have them ready made in the shape shown in Fig. 3.

Brush keepers are also necessary to keep brushes in good shape when not in use. Most of them are, or may be, home-made affairs. Take a keg or tub, lay wires across the top; burn holes in the brush handles so the wires will go through them and hang them over the tub so that the bristles will dip in the liquid up to where the binding on the brush commences but on no account let the bristles of the brush rest upon the bottom of the holder, as it is sure to twirl and ruin a brush. There are many other systems which may be just as good as the one described. One is to put pegs into the sides of the holder, boring a corresponding hole into the brush handle to enable you to hang it upon said pegs. Use the same care to insure the clearance of the bottom of the holder as above indicated, and such a brush keeper will be all right. For varnish brushes, some such a keeper as is shown in Fig. 4

will be much better, as it is absolutely necessary that varnish brushes should be kept free from dust. The brush keeper illustrated here is called the "Paragon." It is an ingenious device for keeping fine varnish brushes suspended in varnish when not in use. It is simple, compact, and easy to clean. It is made in various sizes, holding from four to eight brushes. The supply stores handle many other kinds, which probably are also very good, but this will suffice to illustrate what is needed in a varnish brush keeper.

Fig. 6—Coach Duster.

Picking sticks—A few pickers made from second-growth hickory wood are also needed. Old buggy spokes will answer nicely to make them from. They should be about eight inches long with various curves so as to be able to reach into moldings when cleaning up, or to remove surplus filler from them. Any one can make them to suit his own particular needs. They must be kept sharp as the keenness of the edge is apt to wear out quickly, but this may be readily mended if one has a sharp penknife. Fig. 5 shows how picking sticks are made.

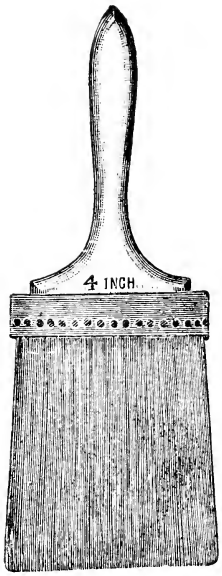

Fig. 7—
Ex. Ex. Stucco
Wall Brush.

Brushes—As brushes are used extensively in nearly all operations connected with wood finishing, it is very proper that considerable space be given to their consideration. It is needless to repeat that no unanimous conclusion has been arrived at as yet as to what style of brush is best for any one process wherein they are employed, and each finisher can talk by the hour in praise of a brush for which his neighbor will exhaust every harsh word in his vocabulary in condemnation thereof.

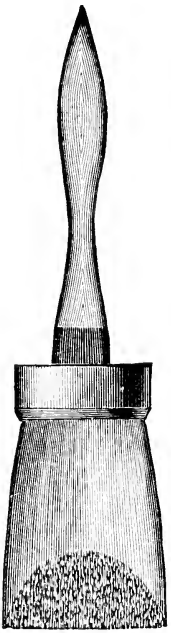

Fig. 8—Metal-
Bound Oval Var-
nish Brush.

Dusters—The first brush that is needed in finishing is a duster, and a most important tool it is, for it is indispensable to the finisher for the purpose of removing dust and dirt from either the raw wood or that may have accumulated upon that which has been partly finished. The finest white bristle coach duster is the only one that will give perfect satisfaction. It is illustrated in Fig. 6, and while they cost about dou-

ble what the ordinary house painters' dusters do, they wear so much better, and do the work intended for them so much more satisfactorily that they will be found the cheapest in the end. They run in sizes from No. 8 to No. 12. The size mostly used and most convenient is No. 10.

Water stain brush—It stands to reason that a brush intended to be used for this purpose must be able to stand a water bath without going to pieces. For this reason, as a matter of course, all glue set brushes are inelig-

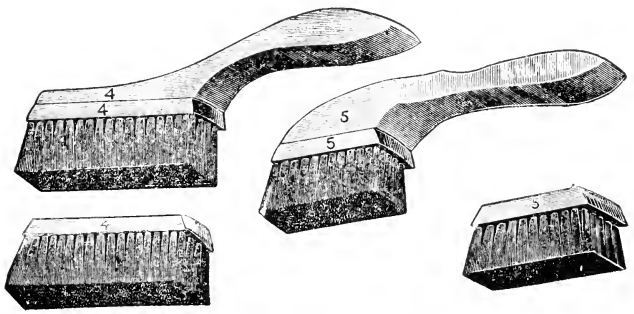

Fig. 9—Picking or Rubbing Brushes.

ible and barred out. As one has to go over large surfaces quickly, so as to prevent laps from showing, a large brush is necessary. Some use a three and a half inch, while others must have a four-inch flat brush for this purpose. When a flat brush is used let it be a good one, set in cement, with a fairly heavy filling, but not too much so. Some manufacturers make a water-stain brush especially for the purpose, but any good extra-extra stucco flat wall brush will answer very well when the

specially-made ones are not readily obtainable. The stucco brush is illustrated in Fig. 7. The best brush for the purpose to the notion of many finishers is a metal-bound chiseled varnish brush of good workmanship. It is claimed for it, and justly so, that the oval form is better for the purpose of rubbing out color than that of its flat rival, as it has more spring in the center than is possessed by the other, which enables the workman to spread his color or stains more evenly or easily. This oval varnish brush will be found useful for many other purposes besides that of water staining; but of this more will be said further on. They run in size from 1-0 to 8-0. (See Fig. 8.)

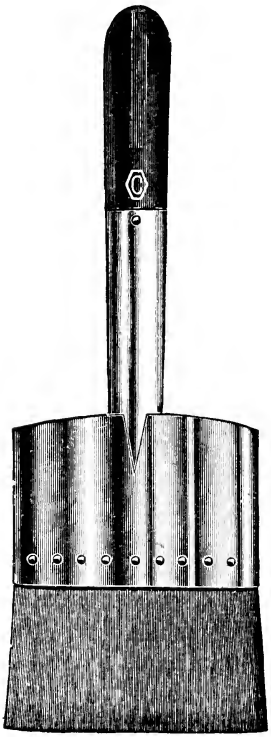

Fig. 10—Bear Hair Fitch Flowing Brush.

Filler brushes—These brushes are usually flat ones, of medium short stock—more so than is used for as good a grade intended for the house painters' use. They should be very full-stocked, more so than for that used in house painting. Nearly all brush manufacturers now make a

special line of flat brushes intended expressly for filling. In this as well as in every other line of brushes, one is frequently tempted by the low prices made for inferior-stocked brushes. It is not the place to venture here on false economy, as the best are, and will always be found to be by far the cheapest, irrespective of the first cost per dozen.

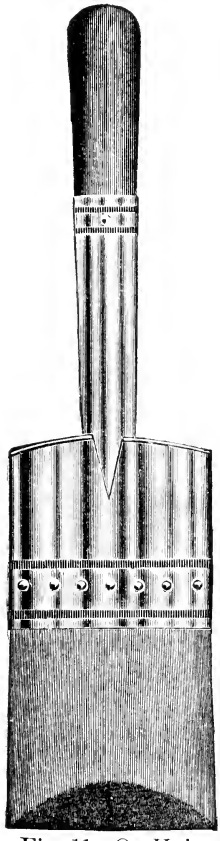

Fig. 11—Ox Hair Fitch Flowing Brush.

Picking or rubbing brushes—These are used exclusively for removing filler from carved surfaces and moldings. There are many varieties and forms of these upon the market, but the one that has a curved handle detachable from the brush head, which is reversible, has justly become the universal favorite. When the bristles become worn on the front (as they will) a screw is loosened in the head and it is turned end for end, and what used to be the end now becomes the head, practically making a new brush of an old one, giving double the wear, and thus effecting quite a saving over those that are not reversible. Picking brushes are illustrated in Fig. 9.

Shellacking brushes—The brush that goes into shellac must needs be a very well made one, or it will prove to be short-lived enough indeed. Each finisher, of course, has his own favorite and many kinds are used for the purpose. That which is mostly used is a good, fine bristle chiseled, metal-bound oval varnish already mentioned under the heading of water-stain brushes. Such a brush is shown in Fig. 8. This brush answers well for nearly all kinds of shellacking. Another brush which is extensively used is a bristle fitch flowing varnish brush, of which more will be said later. Shellacking

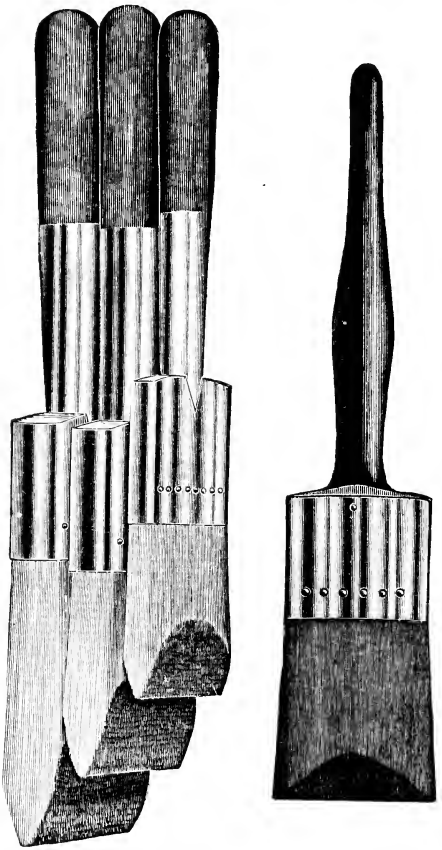

Fig. 12—Bristle Fitch Flowing Brushes.

is very hard on brushes and the best are none too good. With proper care in cleaning and washing them off in wood alcohol immediately after having used them and in keeping them closed from the air in a good brush keeper when not in use, the two varieties mentioned in this paragraph will give good satisfaction and wear reasonably well. The oval varnish brushes come in sizes from 1-0 to 8-0, but those mostly used are 4-0, 5-0, and 6-0. The fitch flowing brushes run from 1 inch in width to 3½ inches. There are several brushes called fitch-flowing beside the bristle one mentioned. They are made from either bear hair, ox hair or badger hair, and all of these may be, and are, used for shellacking on very fine work, each kind having scores of friends, who would almost fight for their favorites. Fig. 10 illustrates the bear hair fitch. Fig. 11 illustrates the ox hair fitch.

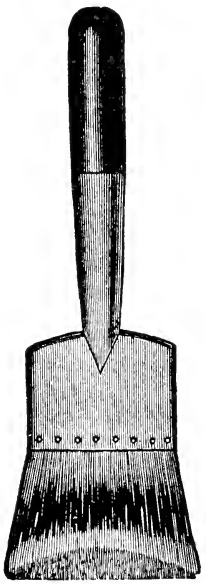

Fig. 13—Badger-Hair Fitch Flowing Brush.

Varnish brushes—For large surfaces and for surfaces where the finest of finish is not required, the oval metal-bound varnish brush (Fig. 8.) is a very good tool, and if put into the hands of an expert varnisher, he will make it show up a finish almost as good as if it had been put on with a bris-

tle fitch flowing varnish brush. Fig. 12 shows two styles of these. They run in sizes from 1 inch to 3½ inches in width, some of them being graded to one-fourth of an inch in width between sizes, others again only to one-half inch. They are known as single, double or triple thick. Both these styles of brushes are excellent, and, in the hands of the right man, produce the best of work.

Fig. 14—Camel Hair Lacquering Brush.

The novice, and for that matter many who are not novices, will fare better with these than with the oval varnish, as they are very apt to skin their work with it, *i. e.*, rub it out too thin, making it look skinny. For all the better class of work, it is better to use the bear hair flowing fitch varnish brush (Fig. 10). It is *the brush*. There is nothing like it, unless it be a good camel hair, but as they have no lasting qualities their use has become nearly obsolete among finishers.

The bear hair fitches run in sizes from 1 inch to 3½ inches in width, and are made in single thick square, single thick chiseled, double thick square, and double thick chiseled.

The ox hair flowing fitch, which is considered by some for certain purposes, at least, as the equal of the bear hair brush, is put up in the same size and shape as the other.

The badger hair flowing fitch is occasionally used with good success by some finishers. In form of style and in width it runs the same as the bear and ox hair fitches, only that it never comes square, but is always, chiseled pointed. In working qualities it is very similar to the other two. It is illustrated in Fig. 13.

Fig. 15—Weighted Wax Floor Polishing Brush.

All the above will do good work in the hands of a skillful workman, but it is safe to say that 80 per cent. of the finishing done in the United States at least had its varnish coats laid on with a bear hair flowing fitch. There is no tool used in finishing whereupon there is such unanimity of opinion and that receives such a univer-

sal homage at the hands of finishers as this *queen* of brushes for fine finishing.

A few assorted sizes of camel hair flat single square lacquering brushes running in size from ¼ inch to an inch in width as illustrated in Fig. 14, also a few assorted camel hair lettering brushes will come handy in applying stains to unsightly sappy parts or to touch up certain parts of the wood, thus producing shadows in it and otherwise mottling it up to improve its looks.

As considerable wax floor polishing is done in many houses a weighted wax polishing floor brush should be kept for the purpose. This brush is illustrated in Fig. 15.

CHAPTER IV.

MATERIAL USED IN WOOD FINISHING.

It was thought best to divide the consideration of material as it may occur in the various operations of wood finishing rather than arrange the list alphabetically, so all substances used have been grouped according to their usefulness for either Filling, Staining, Rubbing, Varnishing or Polishing.

It is not intended to discuss the relative value of any of these here. This will be done under the proper heading and place. So that the mere fact that such and such material has been named in this chapter as suitable and used for making a filler, for illustration, is no endorsement of it for such a purpose. It means simply that it can be used and is being used for such a purpose. Whenever possible to do so the best qualities of the material under consideration are named and a reason given why it is best to use.

MATERIAL USED IN MAKING FILLERS.

Silex—Silex is a rock composed, as its name indicates, mainly of silica. There are many varieties to be found which have the same general chemical composition, but whose atomical formation is different. Some are made up of atoms with a spherical shape, others again with sharp prisms, needle-pointed like. It need hardly

be said that the varieties of it with rounded atoms must be very inferior to the gritty atomed ones, as the latter when once forced into the pores cannot be easily forced out of them again.

Silver White—White Silicate Earths—These substances are so much alike that they may well be bracketed together. In this as with Silex, there is a great variety in the atomical or molecular formation. When about to be purchased it is a good plan to put a little of it upon a piece of glass, add a little oil to it, triturate it with a palette knife and listen for the grit, for it can be heard and also felt under the knife. Fineness of grinding, transparency, clearness and freedom from coloring matter should next receive attention to determine quality. This can be done at the same time that the examination for grit takes place and the piece of glass serves admirably for the purpose of determining transparency, etc.

Corn Starch—There is little if any choice in qualities in this article.

Whiting—(Carbonate of lime)—finely ground.

Plaster of Paris—(Sulphate of lime) finely ground.

The above compose the substances mostly used in making fillers—light colored ones that add no color to the wood. Where it is desired to have a stronger contrast between the pores and the lights, or where the wood has been stained, it becomes necessary to color the filler and for this purpose pigments are added to it. Transparent and semi-transparent pigments only should be used

for this purpose as otherwise opaque ones would hide all the fine details, which make the beauty of a piece of wood, and which it is the main object of the finisher to preserve and enhance.

Raw and Burnt Italian Sienna—This is a very transparent color. To determine quality, place a little of it upon a piece of white porcelain or chinaware, if you have not a slab or palette-board of the same add a little oil and stir with a palette knife. If it has good depth of tone, is clear-looking and free from muddiness and when spread out thin over the white surface of the palette, shows up a rich subdued red brown (in the burnt) then it is good. Notice also its transparency after it is spread out, as this is most essential. The above applies to the burnt.

Raw and Burnt Umber (Turkey)—Although known as Turkish Umber, there are many fine qualities of umbers imported that do not come from that country. This is only a semi-transparent color. Use the same tests for it as have been indicated for Raw and Burnt Sienna, only that instead of a red tone, it should have a rich, deep brown in the burnt and a greenish yellow brown in the raw.

Vandyke Brown—Or Cassel earth, as it is known in some parts, is a bitumous earth. It comes mainly from Germany although there are mines of it in Belgium and Holland. It is transparent and is sometimes very dirty. It should be well levigated or washed free of foreign matter, finely ground and free from specks under the knife when mixed with oil.

Drop or Ivory Black—This black is a semi-transparent color; the words Drop or Ivory are interchangeable, and the only difference between the two is in the label on the cans. It is an animal black, the better qualities being made from the hardest bones, such as teeth, etc. Give it a test for purity of tone, transparency and fine grinding with the palette knife over a white palette board or dish.

Rose Pink—Is a factory-made color on a whiting base. The quality consists in the richness of its color, the permanency of the same, its transparency and fineness of grinding. Apply same tests for it as for the other colors. It is difficult to test this color for durability. Many are made from rose aniline or some other aniline product, and these are very short-lived. Buy of some one having made a reputation on the good quality of this color.

As all the above colors are used in the making of oil stains, it would be a mere repetition to state over again what has been said of each, and all that will be done hereafter will be merely to name them over, referring the reader to the above when occasion requires it.

It is frequently seen that now that woods are colored fancifully without any regard of following or improving nature, and while the fashion lasts to have a table finished in vermilion, scarlet, Prussian blue, all kinds of shades of greens, yellows—in fact the whole range of colors in the spectrum, the finisher is to be able to supply the demand *at libitum*.

tertiary are used, to save making a catalogue of pigments out of this chapter, it was thought best to give a few directions instead that will enable the finisher to select the proper pigments to color his fillers. Where there is a choice between what pigments to use for the purpose, always pick upon that one having the most transparency, clearness of tone and richness.

Raw and Boiled Linseed Oil—These are too well known to require a description. As it is not the object of this work to give more than the very slightest sketch of any of the materials used in wood finishing, the reader is referred to the many excellent treatises published where pigments, oils, japans, varnishes, etc., are treated to the full extent.

Turpentine—Is a volatile oil obtained from the distillation of the crude turpentine of the yellow pine, with common rosin as a residue. It is frequently adulterated with deodorized benzine. Turpentine is known also as Spirits of Turpentine.

Japan—Both turpentine and benzine made.

Naptha or Benzine—Used as a substitute for turpentine in thinning fillers.

Rubbing Oil—For rubbing with pumice stone.

This comprises about all material used in fillers or filling.

MATERIAL USED IN MAKING STAINS

For convenience the same division of stains into

As the whole range of colors, primary, secondary and

groups has been followed here as in the chapter devoted to their consideration to-wit:

Oil Stains.

Water Stains—Made from coloring matter or dyes other than anilines.

Water Stains—Made from anilines.

Spirit Stains—Made from anilines mainly.

Oil Stains—Raw and Burnt Sienna, Raw and Burnt Umber, Drop or Ivory Black, Vandyke Brown, Rose Pink, Dutch Pink, Prussian Blue, and the whole range of transparent colors in oil. It is better to buy the colors already ground.

Water Stains—Made from coloring matter or dyes other than anilines. A partial list of the materials that are used occasionally in the manufacture of stains is here given; also some of the chemicals required to develop them or mordant them.

Catechu, Epsom Salt, Anatto, Quercitron, Turmeric, Brazilwood, Orchil, Madder, Dragon's Blood, Alkanet Root, Red Sanders, Fustic, Camwood, Permanganate of Potash, Verdigris, Gamboge, Nutgalls, Logwood, Steel filings, Bichromate of Potash, Copperas, Vinegar, Aqua Ammonia, Tin, Muriate of Tin, Sulphuric Acid, Nitric Acid, Acetate of Copperas, Chloride of Tin, Tinct. of Muriate of Iron, Muriatic Acid, Sal Ammoniac and many other substances which would only bewilder one to name over. Few of these named above are likely to be made use of as will be explained in the chapter treating on stains.

CHAPTER V.

SANDPAPERING AND PREPARING FOR THE FILLING.

Properly speaking, this operation belongs to the carpenters, if the work to be finished is the interior finish of a house, or to the cabinet makers if it be in a furniture manufactory. All woodwork is supposed to come sandpapered and ready for finishing out of their hands and it may seem out of place that the operation should receive any extended notice in a work on wood finishing.

This is only partly true, however. In a way the woodwork has been sandpapered it is true, but how? There's the rub. Carpenters and cabinet makers are up to all sorts of ingenious ways to save time and labor. Instead of earning their bread by the sweat of their brows, as the Scriptural injunction has it, they have invented a machine to do the work for them. They put a piece of wood in the machine at one end and it comes out sandpapered at the other—a penny-in-the-slot machine sort of way. It is not quite so bad as that some of the machines are surface-working ones, but their work is no better.

These machines do the work from a cylinder, covered with hard felt upon which roll sandpaper has been attached. It is made to bear hard against the wood it is working upon and the sandpaper roll grinds it smooth. While it does its work fairly well for all the closer grained

woods it will be found that in the more open-grained or coarser-grained ones the fibres have been loosened at one end and pressed into the pores at its other side and that it is still fast to the wood at that end.

Wood in such a condition is not in a fit condition to receive the filler and the chances are that if it were then filled the filling would give way and work out, with the consequence that the work would be marred and ruined by the appearance of a lot of fine lines running lengthways or with the grain. This cracking is entirely different from that caused by the misapplication of varnish, as these always appear crossways of the work, thus being easily distinguishable from the other.

It is therefore necessary for the finisher to run all over this machine sanding with No. 1 sandpaper and to sandpaper the wood crossways. This will loosen the fibres and they will then fall off or can be readily dusted off.

The operation of sandpapering is so simple and so universally understood that it would be questioning the intelligence of the readers of this manual to waste any time in explaining the *modus operandi* and with a word of caution the subject will be dropped. This caution is printed in italics as it embodies a fault that many are guilty of.

Never bear so hard upon the edges that these will be grounded off.

After this re-sandpapering (if it may be so called)

has been properly performed, the next operation will be to "dust off" the wood. For this purpose nothing better can be found than a No. 10 duster (Fig. 6) and going over the job carefully. To make doubly sure, go over it again and again, and do not give it up until you can swear that there is not another particle of dirt left on it.

CHAPTER VI.

STAINING AND STAINS.

In the preceeding chapter it was said that the operation of sandpapering the wood was to prepare it for the filler and so it is, if it is to be finished in its natural state, and that operation can take place immediately, if the wood is to so remain; but if it is not to remain in its natural state and it has been decided to color it either by emphasizing its own color or giving it another in imitation of some other wood or to give it a fancy color in imitation of no sort of wood growing either on earth or out of it, then it is time to stop a minute for reflection.

Staining can be divided into two sections, which are very different one from the other. Each one of these sections has minor subdivisions but for a consideration of the general principles that govern stains the division of stains into those known as Oil stains, whose composition is mainly pigments reduced to the proper consistency for application with linseed oil and turpentine or naptha, and Water stains, which may be composed of anything, but into whose composition oil entereth not.

Oil stains would certainly be the ideal stains, and even with their drawbacks they have much to recommend them. The one feature which belongs to them exclusively is that they do not raise the grain of the wood. But

their faults are such that even so great a desideratum as that mentioned above is more than counterbalanced by defects that have practically made oil staining a thing of the past in nearly all the largest furniture factories in the country, although it is admitted that there may be a few notable exceptions. It will be well to notice these defects so that the reader may form an intelligent opinion and be ready to make a selection understanding why he does it.

Oil stains do not penetrate very deeply into the wood, consequently those portions of woodwork which are exposed to abrasion or wear or scratches, will soon show the uncolored wood, the stain having been removed, and such spots serve as a constant reminder that the whole affair is a sham. It must be borne in mind that it is a fact that no touching or any subsequent amount of refinishing, short of completely taking off and refinishing will ever mend it. Even the complete refinishing will hardly make it much better, unless it be redressed below the filling and staining, as it would not be possible to use water stains over the oiled work, and if it is to be refinished in oil stain again after the first experience with it there would be little gained by having it refinished at all.

Another grave objection—that aside from Vandyke brown, which is a bituminous earth and for that reason very transparent, the rest of the pigments used in the make-up of stains are at best but semi-transparent and even these semi-transparent pigments will become more and more opaque with time, thus hiding even from the

beginning or at least marring that delicacy of fine lines, pores and bold lights and shadows which appear so pretty and make up the charms of nearly all woods, but make up the characteristics of quarter-sawed woods.

The only place where oil stains can be of any value is upon white pine or similar textured woods. It is well known that it is very difficult to stain pine in water colors and do a good job. Unless the operator can take the whole panel or strip down at one draw of the brush the water stain will not show up even. The least pressure of the brush on one part more than another will make a spot there. If one cannot take a whole plank or panel down at one sweep and has to give it another sweep of the brush, it can well be imagined what it will look like where the jointure of the two lines come together. There being no such dangers with Oil stains, as it is possible to brush them out evenly and without too much hurry with absolutely no fears of showing laps and an assurance of having a fair uniformity of looks on the job, seem to indicate their use for pine staining at least.

Oil stains are usually made from pigments that have been named over, but may also be made from any of the anilines soluble in oil. It may be well to explain here that the name Oil does not necessarily indicate linseed oil but the volatile oils as well, such as turpentine and benzine or naptha. There is no object, however, in using them, for anilines are fleeting enough and should only be used in water colors as they pene-

trate much deeper, and having been properly treated and mordanted will last a great deal longer than they do in oil. Another drawback is that if the stain is applied to the more open-grained or very porous woods before the filling is done the oil stain has partly closed them and the filler cannot enter and form a good clinch that would prevent it from becoming loose. If, on the other hand, the filling is done first and the staining be done on top of it with the oil stain, there is only a very slight veneer of stain as there is no penetration and for all the good it does it is no better than a coat of colored varnish would have been; in fact it is not so good.

Oil stains are readily and very easily made and this will recommend them to many. For very soft woods that have little or no character of their own to lose and everything to gain by masquerading under false colors, and where such woods cannot be dipped into a bath of water stains the oil stains are the best to use. As it has been said before, they will go on over such soft woods more evenly than it would be possible to apply water stains with a brush.

Water stains are very penetrating and when properly made will bring out the grain of the wood most beautifully and clearly instead of dulling it or clouding it as oil stains made from pigments will surely do.

On account of their deep penetration an abrasion that would show the bare wood upon a piece of furniture or woodwork which had been previously stained with oil

stains, would not show at all had the stain used been water stain.

The one great fault in the eyes of some people, possessed by water stains is that they raise the grain in the wood. Yet, this fault readily becomes a virtue in that this very same grain raising greatly helps in bringing out fully many little details in the wood so stained that enhances its beauty after having been properly finished.

This grain raising involves additional work, it is very true, for it is necessary to sandpaper down this raised grain to obtain a perfect level. This additional work consists mainly in rubbing, but this expense of elbow grease will be more than amply repaid when after the last coat of varnish has been rubbed and polished the work done on the wood stands out clear and bright as a jewel—a thing of beauty and joy to the heart of the enamored-of-his-art-finisher.

Water stains may be made of any coloring matter or coloring substances that are soluble in water. Of course many need a mordant to fix them. Various formulas will be given of how to make them. They can be bought ready made; many of them will hardly pay to make in a limited way, but as it is sometimes very hard to procure exactly what is wanted ready made, it is well to know how to prepare them. The proper mordants will be given beside the general ones that may be used in connection, or rather applied over, the majority of the water stain formulas given.

In the by-gone days of the not so very long ago, the secrets of making these stains were very carefully guarded and kept as heirlooms, descending from father to son, or were bought outright and considered as capital in the business. While a few were good and even today deserve a place at least in the memory of the finisher, the great majority of these recipes for stains were very cumbersome, uselessly loaded down with unnecessary ingredients, and very inconvenient to make and some of them nearly impracticable. Most of them have disappeared and become obsolete since the advent of aniline colors.

Great discoveries and improvements in the manufacture of aniline colors have been made within the last few years and are being made even now by chemists in search of something new in the nasty looking and vile-smelling stuff which is known under the name of coal tar. These late discoveries have given us Alizarin, Purpurine and many other colors among the many-hued anilines, and these products are now almost displacing all others in the making of water or oil and spirit stains.

The wood finisher has been relieved of a lot of drudgery and is not kept on the anxious seat dreading the operations necessary in olden times to prepare the stains required in his business, nor does he have to burn midnight oil in watching a slow fire boiling a 30-hour concoction, and he may well be thankful that he has been relieved of

many of the labors and anxieties which were formerly necessary to produce stains.

Formulas for making water stains will be given first of all—a few of the old stand-bys and those more modern ones that are used with good success.

As Water Stains made from anilines or alizarine, etc., are very readily and easily made, and are about all made alike, all that will be necessary will be to give general directions how to proceed and these will be applicable to all.

In giving a formula for staining wood of a certain color, say mohogany, for example, it must always be borne in mind that some woods being much more absorbent than others they will, of course, show a much deeper tone of color than those woods that are of a close-grained, non-absorbent, water-repellent nature, and the stain may color one kind of wood a very dark mahogany but would hardly color another of the latter class to a light cherry tone. When this is well understood there need be no trouble about it. Some woods require two and even three applications of the stain to obtain the effect wanted.

It will not pay to become discouraged if at the start things go wrong or get mixed up a little. Experience is to be bought only by perseverance in this as well as in every other process of wood finishing, or for that matter any other business or enterprise. Where the stain contains a large portion of alkaline matter, brushes will be quickly destroyed by the corrosive action of the lye upon the bristles. It is therefore better to make a dauber of

cloth which is easily replaced by another when eaten up, and apply the stains with this instead of a brush. It seems superfluous to warn persons to be careful of their clothing and hands or any part of their anatomy. A hint to the wise is sufficient.

Besides the liquid stains there are mechanical methods of darkening or coloring some woods which have much to recommend them. However, they are only applicable to furniture, and it would be impossible to use them in house finishing. The antique finish of oak, for instance, can readily and more closely be imitated by the method described below than by colored stains.

All are aware that most woods darken and change their colors simply by age. So much so that it would be very hard to recognize them by the colors, at least. In the main this change is caused by the action of ammonia present in the air in very minute quantities, it is true, but still present and slowly accomplishing its work of combining with the tannic acid contained in most woods and darkening them.

It stands to reason that if an article of wood can be placed where ammonical fumes can reach it, this combination of ammonia and tannin will take place in a much shorter space of time than it would or could under ordinary conditions. So the process is simply an acceleration of a natural one.

To concentrate the action of the ammonia, and to keep it from being wasted, as nearly an air-tight room

should be had as it is possible to secure—a bicycle japanning oven would be just the thing. The articles to be darkened could be put inside and subjected to the fumes of strong ammonia for eight or ten hours.

If the articles are small a large dry goods box can be used—the articles being placed in it, and the ammonia placed in a dish, after which the cover can be securely nailed. It may not be absolutely air-tight, but will be sufficiently so for this purpose.

While antique oak has been mentioned, this process is applicable to all woods such as mahogany, or any other which develope a rich shade of color by ageing. The process simply hurries up nature.

It might as well be said here that by the coloring of fillers really a partial staining or change is effected in the natural color of the wood and it is well to bear this in mind in judging as to the amount and depth of stain that should go on.

While in giving formulas the name of the wood most nearly of the color of the stain is given it is arbitrary in that, for instance, any of the mahogany stains will make a cherry stain if applied thinner and a cherry stain would make a mahogany stain if applied repeatedly.

Stains can also be combined when they have the same general composition, and many variations can be made in the tone of the tints. As the fancy colored stains are so much easier made from the aniline dyes than from other coloring material, only a few formulas are given of

the old fashioned dyes. Formulas given under the heading of "Oak" are mainly intended for very light woods or pine to imitate the color of oak. As that particular wood has so many shades and tones varying from each other, there is room for much fancy. Oak itself is seldom stained, unless it be to imitate age as in the "antique" or to brighten it as in "Golden Oak."

It will be well to have a few planed boards about for the purpose of testing all the stains made. If too strong they can be reduced. Repeating the application will usually give the deeper tones and with some of the formulas it is impossible to avoid giving several applications to obtain the tone as dark as required.

CHAPTER VII.

A COLLECTION OF FORMULAS FOR MAKING STAINS.

WATER STAINS.

No. 1—Mahogany.

Fustic chips.....8 ounces
Madder root.....1 pound
Water.....2 gallons

Boil for two or three hours, strain and apply boiling hot.

No. 2—Mahogany.

Dissolve orchil in water and make it of such a strength as will suit your needs; add a trifle of eosine.—Apply cold.

No. 3—Mahogany.

Make a decoction of logwood chips by boiling them in a closely-covered vessel in twice their bulk of water, for two hours; strain; add a small quantity of chloride of tin. This will give it redness. Be your own judge when to stop. Apply two coats.

No. 4—Walnut.

Dissolve catechu, broken up in small pieces in about twice its bulk of water. Add bi-chromate of potash to darken it.

For some shades of walnut add a trifle of eosine to the above.

No. 5—Walnut.

Permanganate of potash.....1 ounce
Epsom salt.....1 ounce
Water.....1 quart

Dissolve, strain, and apply, repeating till darkened to suit.

No. 6—Walnut.

Nutgalls (crushed).....3 ounces
Concentrated lye.....4 ounces
Vandyke brown (dry).....8 ounces

Boil, strain and apply hot.

No. 7—Walnut.

Vandyke brown.....2 pounds
Potash or lye.....1 pound
Water.....12 pounds

Boil till the bulk is reduced to less than half. When cold apply to the wood with a cloth or pad.

No. 8—Walnut.

Mordant the surface with a solution of bichromate of potash, then apply an infusion of logwood or fustic.

No. 9—Walnut.

Vandyke brown.....1 pound
Concentrated lye.....2 ounces
Water.....1 gallon

Boil until reduced one-half. Apply warm.

No. 10—Walnut.

Vandye brown.....4 ounces
Burnt Turkey umber.....3 ounces
Aqua ammonia.....1 pound

Mix and apply after straining. It may be left to stand for a few days to kill the pungent smell.

No. 11—Rosewood.

Any of the mahogany stains will make a rosewood stain if repeatedly applied. If stained with these to a dark mahogany tone the work is gone over lightly with an ebony stain. Load a camel hair pencil with ebony stain and run over the surface in that hap-hazard, straggling way peculiar to the grain of rosewood.

No. 12—Cherry.

Spanish Annotto.....1 pound
Concentrated lye.....1 ounce

Boil for half an hour. If not deep enough to suit, boil more to concentrate it. Gamboge added to it will darken it.

No. 13—Cherry.

Any of the mahogany stains reduced will make cherry stains.

No. 14—Oak.

Asphaltum gum.....¼ pound
Turpentine.....1 pint

Dissolve, strain and brush over.

No. 15—Oak, Dark.

Burnt Turkey umber, ½ pound, aqua ammonia sufficient to mix into a stiff paste. Thin with water until it is of the shade wanted. Strain and apply.

No. 16—Ebony.

Extract of logwood.....3 pounds
Concentrated lye.....1 pound
Water.....7 pounds

Dissolve by boiling, strain and apply either hot or cold. When dry go over the work with a strong solution of vinegar and iron.

No. 17—Ebony.

Sulphate of iron.....1 pound
Water.....1 gallon

Dissolve and wash over the wood repeatedly; when dry apply a strong decoction of logwood.

No. 18—Ebony.

Sulphate of iron.....½ pound
Chinese blue.....2 ounces
Nutgalls.....3 ounces
Extract of logwood.....2 pounds
Vinegar.....1 gallon
Carbonate of iron.....¼ pound

Boil over a slow fire for two or three hours; strain and apply either hot or cold.

FANCY COLORED WATER STAINS.

No. 19—Crimson.

Brazilwood pulverized.....1 pound
Water.....3 pounds
Cochineal.....½ ounce

Boil the Brazilwood with the water for half an hour. Stain and add the cochineal. Boil gently for another half hour, let it cool and it is fit for use.

No. 20—Violet.

Make a solution of orchil and soluble indigo blue of such strength as required. Strain and apply cold.

No. 21—Blue.

Indigo blue.....3 ounces
Sulphuric acid.....1 pound

Put the two together in a porcelain dish and let the indigo dissolve, which will take some twenty-four hours or more. Shake it up occasionally to hasten the process. Add a pint of boiling water and strain, applying to the wood while hot. Before the indigo stain has completely dried, wash over the surface with a solution made of 3 ounces of cream of tartar in one quart of water.

The above cover the field of stains made from material other than anilines. It would be very easy to prepare page after page of formulas but the above covers all that is essential or worth having, at least among those

that it is possible to make without more trouble than they are worth.

On account of the great cost of alcohol very few stains are made from it and spirit stains are almost unknown now.

However, a few are here given—by mixing, various shades can be made from them.

SPIRIT STAINS.

No. 22—Yellow.

Turmeric powder.....1 ounce
Alcohol.....1 pint

Digest four days, shaking the mixture occasionally, and strain for use. Brush over the wood two or more times until the depth of coloring wanted is obtained.

No. 23—Yellow Red.

By adding an alcoholic solution to the above (No. 22) of dragon's blood any degree of redness can be obtained up to an orange.

No. 24—Mahogany.

Dragon's blood.....1½ ounces
Carbonate of soda.....½ ounce
Alcohol.....1 pint

Digest a few days to make it dissolve, filter and after applying the following wash, brush it over. Take dilute nitric acid and wash the wood with it before applying the stain.

No. 25—Ebony.

Dissolve extract of logwood in wood alcohol to the strength desired, strain and apply. Develop the color by going over the work with tincture of muriate of iron.

No. 26—To Brighten Stains.

The following recipe will not give color to the wood, but will brighten up water stains:

Nitric acid.....1 ounce
Muriatic acid.....¼ ounce
Grain tin.....¼ ounce
Rain water.....2 ounces

Mix in a bottle a few days before using and wash over the stains for the purpose indicated.

ANILINE STAINS.

These are so easily made, are usually so very clear and free of any cloudiness that they may be said to have supplanted all others.

Anilines (and under that name is included all the coal tar products such as alizarine, eosine, etc.) are made soluble in either water, oil or alcohol.

They will dissolve, any of them, much better in warm than in cold liquid and about all the direction that there is to give is to have your water hot or your turpentine hot if it be soluble in oil, or your alcohol hot if it be soluble in that. A single recipe will suffice for the whole list and for the purpose of illustration the following which is so much used in mahogany imitation is given.

No. 27—Mahogany

Bismark brown.....1 ounce
Water.....3 quarts

Let the water be boiling hot and dissolve. Let it cool and it will be fit for use.

For the other stains instead of Bismark brown substitute any of the others and you have it.

In making stains from anilines that are soluble in oil, turpentine, is of course, more desirable as a solvent and vehicle than linseed oil as that remains in the pores of the wood where it is not wanted and linseed oil stains are not as penetrating as turpentine made ones. But turpentine dissolves the dyes slower than linseed oil, so that a mixture of the two is better as a solvent. The liquids must be kept warm and frequently shaken or the process of dissolution will be very slow and at the best several days will pass by before it is complete.

While it may be objected that aniline stains are not very stable, yet by careful usage they are fairly so. Some have the coloring matter much more stable than others and they are being improved constantly in that respect. Those derived from alizarin are fairly permanent. Alizarin, it is well known, is the coloring principle contained in madder root. That now produced from coal tar is absolutely the same, as it is chemically, atomically and in so far as it has been noticed, in its ability to withstand exposure to the sun's rays.

Many of the anilines proper are helped very much by

the addition of vinegar, which prevents them from this fading tendency.

The common names of most aniline and alizarin colors are rather mixed up and a correct nomenclature for the same is one of the good things to come as yet. Each manufacturer has fancy names for certain colors or mixtures that puzzle and cause one frequently to purchase an article that is not wanted.

It is better to buy by naming the color wanted as, aniline blue, aniline black, yellow, green, violet or whatever it may be, substituting alizarin in place of aniline when purchasing the latter quality.

Bismark brown forms an exception, as it is known under that name in all English speaking countries.

CHAPTER VIII.

FILLING AND FILLERS.

Filling is the all-important operation to the wood finisher, which cannot be slighted, and which, if it has been imperfectly done, is sure to cause confusion at some later period.

If one takes into consideration the fact that good filling means the perfect leveling up of the surface of the wood upon which is to be produced that mirror-like uniformity of finish which is so beautiful to look upon, it is easily conceivable that it is only with the greatest care that the foundation for it can be properly laid.

The woodwork having been properly sandpapered and dusted, as related in a former chapter, it is now ready to be filled. There is no operation in connection with wood finishing that has undergone so complete a change within the last quarter of a century as that has. The leveling up of the wood surface by the ancient process of shellac varnish and oil with an unlimited use of elbow-grease and patience, which so justly struck terror to the hearts of the operators, has been relegated among the things that "have been."

The next progressive step was the mixing up of corn starch and other similarly transparent substances with oil, turpentine and japan and of using these for a filler. It was a great step forward, and the system has now many

advocates who do very good finishing upon this filling; but corn starch or any other substance of a vegetable nature used for the purpose of filling has many drawbacks, one of the greatest being that they undergo chemical changes and decay and these changes are detrimental to the durability of the finish that is placed upon them. Another fault that it possesses, in common with all substances used in filling, mineral as well as vegetable, is that being composed of spherical atoms, they do not adhere very firmly to the pores and are easily dislodged; nor do they penetrate as well as those substances which have a wedge-like or needle-like prismatic formation of atoms.

With the great impetus given to wood finishing some twenty years ago, when hardwoods began to be employed more largely in the finishing of interior woodwork for dwellings, stores and other structures instead of the soft woods and paint, experimenting began to take place and search was made for some inert mineral substance of perfect transparency that would prove superior to corn starch, whiting, etc. The searchers were successful, and there was another great step then made (in that it made filling which had been an ornamental but risky operation) as safe as could be desired.

There is now no question as to what is best to be used in the making of fillers. It is silex, or rather that form of it whose atomical formation permits it to be ground into the finest kind of needle-shaped fragments. All kinds of silex stones are not fitted alike for the pur-

pose of filling. Those forms of it that grind up into spherical fragments are no better for filling than that much whiting, although harder. There are other minerals whose atomical formation is prismatic and when perfectly transparent they are as good or better even, than silex for some certain kinds of work, if they are of a lighter specific weight, as it will be noted further on.

As formulas will be given at the end of this chapter for making fillers, and as the manufacturers of that article have cut the prices so low that it will hardly pay one to make it for himself, it will be taken for granted that the filler is ready at hand, prepared to be applied.

Fillers should dry, or rather set in a reasonably short time, between fifteen and thirty minutes, and for that reason should not contain any more linseed oil than is absolutely necessary for a binder. The linseed oil used in the grinding of the paste should be refined raw linseed oil of good quality, and where it is used at all in the thinning of the paste should also be of the same character. This is for the reason that linseed oil darkens with age, and while this will make no difference in woods that are darkened or stained, it would have a tendency to mar the very light woods by its very slight opaqueness. There must needs be some very light-colored japan to dry the linseed oil and also as an additional binder. Turpentine or naphtha should be the principal liquid used in thinning the paste. Where there is no hurry, and where the odor of naphtha is objectionable, of course turpentine should be employed.

If, however, cost of material and time is an object as it is in nine cases out of ten, in furniture factories, at least, then naphtha will be used in place of the turpentine. There is no difference whatever in the results whether one is employed or the other. The only difference between them is that turpentine does not evaporate as rapidly as naphtha, and consequently the rubbing-off cannot commence so soon. The filler can be applied with any good flat brush, but such a tool as has been described under the heading of "Brushes" is best for the purpose.

The operation of applying the filler is a very easy one, and as the saying is "any one can do it." The only one thing required being that there be no part of the work slighted, or in painters' parlance—that there be no "holidays." As soon as the color of the applied filler begins to change from a wet looking to a dull, whitish, dryish appearance with a flat look to it, then it is ready for the "Rub off." It is the almost universal habit to use excelsior or shavings for that purpose and that material answers fairly well; but for first-class work, flax or hemp tow will be found the best, as a very careless man or boy might rub some of the filler out with the excelsior and this is next to impossible with the tow; it would have to be wilfully done. The danger of rubbing filler out of the pores comes from the fact that operators seldom wait until the filler has properly set before commencing their work, being afraid it will set too hard for them before they get through with their job, so they commence the work when

the filler is only partially set and at that stage it is possible to rub it out with excelsior. If, as has already been remarked, one will only wait a sufficient time for a proper setting, there need be no fears of the results. A person should easily be able to judge of the amount of filling that should be gone over ahead of the rubbing and guage it so it can be accomplished before it sets too hard. As it is impossible to clean out all the filler from the mouldings, carvings, etc., the carved wood pickers can be here used in connection with soft rags. The picking brush (Fig. 9) is very useful here and will do the work quickly, except in corners where the picking sticks should be used.

In some of the furniture manufactories it is the practice to fill some parts, at least, and in some cases the whole of certain articles, by the process known as "dipping." There is a tank into which the filler, thinned to the proper consistency is poured, and the articles to be filled are dipped into this. This is only practicable with tables, chairs, etc., and of course is out of the question in house finishing. As it is probable that persons interested in furniture making may read these pages, it was thought proper to mention this method. High grade furniture is never dipped, and many articles of cheap furniture cannot be so treated. As in the struggle for cheap products of our present days, it is well to know how even a cent can be saved on an article, and unfortunately many a finisher may think that the saving of cash is not restricted to the dipping tank but follows him all the way through his

work to the polishing off. For this dipping tank business a very finely ground silex is absolutely necessary, otherwise it would precipitate too readily and would not stay in suspension in the tank after having been thinned. Other forms of silica of a lighter specific gravity can be used here to a good advantage, and a good "silver white" being lighter than silex, will answer well for it.

All material that could possibly be used in making fillers will precipitate. It is only a question of time with them. There are tanks made now with agitators that are run by power. These agitators occupy a small space at the bottom of the tank and over them is a grate that prevents the furniture from coming in contact with them. Where such are in use it does not matter so much about the specific gravity of a filler, and a heavy filler can be used. Where the tank is a plain one the light weight filler is the best, as it will not be necessary to stop so often to stir it up into a uniform mass with a paddle. In other words, it saves time.

Here it may be repeated that competition has brought the prices of fillers down so low that it will hardly pay one to make them for himself. While it is not very difficult to prepare them, few have the proper facilities for their manipulation. Very few, even among the largest of the furniture manufacturers, find it sufficiently advantageous to manufacture their own fillers, but prefer to buy them already prepared. Some of these use large quantities and buy them by the car load. They prefer to

buy them ready made for two reasons, and both are good ones. The first is that they cannot make them themselves any cheaper; the second is that they can rest assured of a uniformly made article that will always work in the same way, and besides the saving of the machinery necessary to make it and of skilled mechanics to run it for whom they would not have employment all the time.

All manufacturers of fillers make a line of colored fillers, as well as the light ones, to suit the various kinds of stains that are used in coloring light woods. As it is very inconvenient for many furniture factories or for wood finishers to keep so many shades of ready made filler on hand to suit their work, most of them buy the light filler and color this to suit themselves by the addition of dry colors, or better, finely ground colors in oil. Those mostly used are Vandyke brown, burnt and raw sienna, burnt and raw umber, rose pink, drop black, rose lake, etc., all of which have been reviewed in a previous chapter.

FORMULAS FOR MAKING FILLERS.

No. 29—Light Filler.

No. 1 Silex.....any quantity
Bleached linseed oil (raw).....one-third
Light japan.....one-third
Turpentine.....one-third

Mix the liquids together and add sufficient quantity to the silex to make a stiff paste of it; then put it through a mill and grind it or at least treat it under a chaser for proper trituration.

No. 30—All Other Fillers.

For silex substitute any other substance that you wish, and proceed to make a paste of it employing the same process as indicated in formula No. 29. If you want a colored filler, add any of the colors mentioned above; only if they have already been finely ground in oil they can be added to the light filler without regrinding.

CHAPTER IX.

SHELLACKING.

With hardwoods shellacking is the next process that comes after filling the wood. The main object of doing this work is to close the pores thoroughly, sealing them up hermetically as it were and to prevent the sinking in of the coats of varnish used in finishing.

The first thing in order will be to ascertain as to whether the filler is thoroughly dry. It is impossible to feel certain of this by the touch since after it has been rubbed off there is none remaining upon the surface and to the touch it is apparently dry. The filler, however, has penetrated and has been rubbed in deeply at least in some of the pores, and being there excluded from the immediate action of the oxygen in the air the process of the hardening of the oil (which is due to its oxidation) is necessarily very much slower than it would be if the air had free access to it. As long as oil is not thoroughly dry it will never do to shellac over it.

It must be borne in mind that unless there be a complete sealing up of the surface to the subsequent penetration of the finishing coat or coats of varnish, it will be impossible to obtain a good finish. The finishing coats of varnish are mentioned here, but the shellacking or sealing-up coats should also be unable to penetrate the filling. It can easily be perceived what mischief this penetration

would cause. Wherever the shellac coat would sink in there would be a hole and the mirror-like surface would be broken up and the finishing would remain full of blemishes to the end.

Shellac dries very quickly, and it is this one quality that makes it so serviceable for the purpose of sealing up pores. It sets in a few minutes and dries so as to be sandpapered in six to eight hours. This very rapidity of drying is what prevents it from soaking in and softening the oil in the filler over which it is applied. It is therefore obvious that after this coat of shellac has dried hard, the chance of a partly-dry filler beneath this impervious coating ever drying hard is very small indeed. Now, if this partly-dry filling is covered with a bone-hard coating as that of the shellacking will be in twenty-four hours, there is bound to happen this—that the filler coat being much more elastic (on account of its non-drying) than the hardened shellac coat, it will expand more than that will, with the consequence that there will be a parting of the shellacking in order to follow the expansion of the filler with the result of fine longitudinal lines, and as these do not show up immediately and the finishing coats of varnish have been applied and the job completely finished, this longitudinal cracking does not make its appearance until too late to be remedied and the chances are that the varnish manufacturer will come in for a good share of execration for furnishing poor material and all this because "the filter was not dry." It is therefore very important

that a perfect assurance be had that the filler be dry before proceeding with the shellacking, and the way to be sure of this drying is to give it plenty of time, aud a little over, to make double sure of this. This impervious coating, or sealing up of the pores, can be produced with other material than shellac, but the process itself has come to be called and known as such, irrespective of any other material being used for that purpose.

Varnish will accomplish the same results, and some of the liquid fillers would, but none will do it as effectively as an alcoholic solution of shellac does it, and this is probably why the operation has retained the name of shellacking. On cheap work it is even accomplished by the use of glue size, and this serves the purpose very well, (for a while). The water-repellant filler will not allow it in its company and rejects it altogether, leaving it dry upon the surface. As it is perfectly clear and transparent, if it has been made from good glue, it leaves no marks of its own upon the work, and varnish brushed over it will show up fine, bringing out to perfection everything there is in the wood beneath. Over certain stains, where alcohol enters largely in their composition, the glue size is sometimes used to better advantage than shellac, and in water stains, where lye and potash are not used, glue size serves as a developer and, in a sense, glue size is necessary to bring out the best coloring in the woods.

At one time many persons used "oil shellac" under the wrong impression that the oil in its composition made

it more elastic and consequently more serviceable than the spirit shellac varnishes, but that was a mistaken notion and plainly a case of misplaced confidence in a name and it is not the only case by long odds of misapplied "English" in the wrong naming of material. There is little or no oil used in the make-up of the so-called "oil shellac," and for that matter very little or no shellac, the composition of most of these being mainly rosin and naphtha or turpentine. The manufacturers probably ease their consciences by putting in five grains of shellac to the gallon and they might then be on a par with the manufacturer of some grades of "white lead" which bears upon its label a guarantee of forfeiture of $100 for any white lead in the package that is not pure. Said white lead on analysis being shown to contain 0.50 or less than one per cent of its composition. If oil was a leading ingredient in the composition of oil shellac, it would make it a slow drier and thus defeat its employment for the operation called shellacking since it would sink into the pores of the wood. In other words, its slowness of drying would soften the filler and permit it to sink into it. It is certainly not so good as a coat of good, quick-drying varnish would be for such work.

Pure grain alcohol shellac, either the orange or the white, according to whether the wood is a dark one, a dark stained one, or a light-colored one, is the only article that ought to be used on first-class work, and the only one that can be conscientiously recommended for the pur-

pose. The orange shellac is stronger than the white, and should be used when possible, for the reason that one good coat of it is usually sufficient to make an impervious coating over the filler, while it may be necessary to give two coats of the white to make sure of having accomplished the same purpose. However, the white shellac is easier to apply than the orange. As it sets less rapidly, it does not show laps as readily as the orange. Wherever the latter is used, one should be very careful in applying it to make all joinings only upon wet edges so as to prevent laps and doubling up. Nor should one attempt to brush it when partially set as it is sure to double up and roughen. Where white shellac is used, one is always sure of doing good work, for it is so transparent that even doubling up hardly ever shows through, and two coats will always be sufficient to stop suction.

Upon all close-grained woods, where "filling" is not resorted to previous to shellacking, especially pine, etc., the white shellac is about the only one that can be used successfully, except, of course, where an expert has the putting of it on, he can use the orange for the double purpose of coloring the pine at the same operation; but of this more will be said under the heading of "soft woods."

Shellac which has been dissolved in wood alcohol is being largely used because of its greater cheapness, but the smell—whew! Well, as to that, if one can stand it, wood alcohol shellac does fairly well. It is a trifle longer in drying than grain alcohol shellac, and for this reason

a little longer time should elapse between coats. Regardless of the fact that the evaporation is slower than the other, wood alcohol shellac will not bear working or brushing to the same extent that grain alcohol does, and for that reason has to be applied quicker.

For the styles and kinds of brushes best suited for shellacking the reader is referred to Chapter III.

FORMULAS FOR SHELLAC VARNISH.

No. 31—Orange Shellac.

Orange shellac.....4½ pounds
Grain or wood alcohol.....1 gallon

Digest and occasionally shake the mixture. In cold weather place in a warm place until dissolved. At all times of year warming the solvent will hasten the process of solution.

No. 32—White Shellac.

White shellac.....5¼ pounds
Grain or wood alcohol.....1 gallon

Use same directions for dissolving as are given in recipe No. 31.

The above recipes are given not so much as a law concerning the amount in weight of shellac to be used, but as a guide, some using more and some using less than the amount herein given. It may be bought ready made for less money than most people could buy the material to make it with. This is somewhat mysterious and hard to explain aside from the fact that varnish makers buy in very large quantities and can get the raw material cheap-

er. When shellac is offered at less than the wholesale market price of raw material, look out for it. Although a salesman may be willing to swear to its absolute purity upon a stack of bibles, look out for it.

Manufacturers make many grades of pure grain or wood alcohol shellac, and while there is room for variation of prices in a grade containing a lesser number of pounds of shellac to the gallon than another containing more, the difference in prices will not always be accounted for by such a difference of weight alone. Highly flavored names, such as cologne spirits, are certainly very fine in their proper place, which should be outside of shellac varnish. A furniture manufacturer once remarked to the writer that he preferred to make his own shellac as then he was sure of having what he wanted, although it cost him more money than he could buy it for.

The above was not written with any intention of casting any reflection upon the honesty of manufacturers of shellac varnishes. Most of them make as good and pure an article as it is possible for one to make for himself, but for the purpose of putting finishers on their guard, so that when the baited hook of an unreasonably low price is made for a so called pure article they may not bite and swallow it.

Before turning the job into the hands of the varnisher it should be carefully sandpapered with No. 0 sandpaper. Shellacking sandpapers as fine as silk. The only caution to give in respect to this operation is to be careful of the

edges of the work and do not bear down so hard that you cut through the shellacking. Should the sandpaper be new, rubbing two pieces together for a few moments will make it work better without danger of scratching. If too stiff to bend readily into moulding, etc., remove one or two layers of the paper from the back.

CHAPTER X.

VARNISHING AND VARNISHES.

This operation is one which brings out the beauty of the wood to its highest degree and which will bring either credit or disgrace to the finisher, according as to whether the perfect levelling of the filling and of the shellacking processes have been well or badly performed.

As it has been said and explained in the former chapter the suction must have been thoroughly stopped by those two previous operations so as to stop the penetration of the varnish, so then even a slow drying one will effectually be prevented from entering or sinking into the pores.

If the work is being done upon the interior woodwork of a house, before commencing the varnishing, see to it that it be thoroughly cleaned and dusted—not only with a dusting brush, which after all will only scatter it to settle elsewhere, perhaps upon a freshly varnished surface, in an adjoining room and make that look specky, and if the doors are closed, to fall back into the room to rise again when the floor is walked upon and settle upon the fresh varnish. The only true way, after having dusted it carefully and allowed the dust to settle, is to take a damp cloth (not a wet one) then carefully go over the floor with it to take up all the dust that has settled upon it, then for the woodwork run over it with a damp-

ened chamois skin, being careful to carefully go over all mouldings, carvings and corners. Occasionally wash out the chamois skin, rinse it as dry as possible and proceed till the whole woodwork has been gone over.

It is well to note that while the floor of the room must be moist, it should never be so moist as to be wet, as this might cause considerable trouble and mischief. The room to be varnished should be kept at about 70° Fahr., as one cannot obtain the best of results when the temperature runs much lower than that. Artificial heat must be resorted to to obtain the proper temperature, if the finishing is being done in cold weather. The room having been cleaned and the proper conditions of temperature having been obtained the varnishing is ready to be commenced.

The observer may think, when he is watching a varnisher at work, that it is one of the simplest and easiest of operations and that any one can do it, but the ease and simplicity are only in the looks. In reality there are but few first-class varnishers. Men are frequently able to achieve success with a much more difficult work than varnishing looks to be, but they make a total failure of this when they undertake it.

While the operation looks as simple and easy as the proverbial "falling off of a log" it is easy only to the one who "knows how."

There can be no rules given nor laid down, from the mere reading of which one can ever make a good var

nisher. Practice and experience will in time make a good varnisher of a man, if he has it in him. Some say that good varnishers are born, not made. That is going a little too far, for it is a dull man indeed who cannot acquire the art, if he will only try hard enough. But alongside the first-class varnishers there is a large class that can be numbered with the good varnishers, and as all do not turn out to be the former, they can all certainly be numbered among the latter.

Any good painter who has varnished painted work and has not had it sag and run away from him ought to be able to do a fair job of varnishing over wood finishing, if he will follow carefully the rules given further on. The finishing may be done with a single coat of varnish consisting of flowing finishing varnish, or with two or more coats of the same left on with a full luster or it may consist of several coats of rubbing varnish (the method of rubbing varnish is explained in Chapter XI.) and a finishing coat of flowing finishing varnish flowed on and left as it is or the same rubbed and polished to either a dead finish, a semi or egg-shell gloss or to a high lustre, according to the wish of the finisher.

As all these operations do not properly belong to the subject of varnishing the reader is again referred to subsequent chapters where all these processes are explained under their proper headings.

As it was stated before, the finishing can be done with one coat of varnish over the shellacking if the work

only calls for that or it consists of cheap furniture, and it will look very well, indeed, if a good flowing varnish is used, it being taken for granted always that the filling and shellacking have been properly done. Unlike painted work, varnish can be applied to natural wood, and it requires a much heavier coat of it to cover it perfectly and allow it to flow level.

It is a matter of convenience as to what tools should be used in putting on flowing varnish, and that which a man has been accustomed to is no doubt the best for him to use but as this advice is written professedly to teach the art to men who probably have formed no particular attachment nor become habituated or wedded to any particular style of brush, the bear hair fitch flowing(Fig. 10) is strongly recommended, although Fig. 11, Fig. 12 and Fig. 13 represent very good finishing brushes.

For ordinary surfaces that are not much cut up by mouldings or carved work, and which consist mainly of wide panels and stiles, a three-inch bear fitch is the best size to use; for smaller surfaces, smaller brushes are necessary. As they run in width from one inch up, with gradation of ½ an inch between sizes, it will be very easy to procure the right size wanted for any particular work.

In applying varnish always commence at the panels, being careful not to touch the stiling or mouldings next to them any more than is absolutely necessary, as it will set, if it be a quick varnish, before the panels can be properly laid off.

Put the varnish on with a full brush, rubbing it out crossways. Finish by laying it off up and down with the grain. If the varnish has been flowed on, as it should be and it be finished or laid off crosswise, it will surely sag along the brush marks; but if it has been laid off with the grain it will not be nearly as apt to do so and a greater quantity of varnish can be put on, which will give the job a much better finish. This flowing is what usually puzzles the house painter most, for he is almost sure to "skin" his varnish as a hardwood finisher terms the scanty application of varnish. The house painter being used to skinning his varnish over painted or grained work does not readily fall into the right handling of the flowing coat from fears of using two much varnish. While speaking to painters the advice is to guard against too scanty a use of varnish, yet it will be well to advise against a "too plentiful" use of that article, as that is to be avoided as well as the former practice. Practice alone can give one the habit of judging exactly what amount is the right one to put on. Too much varnish will make the finish crack. It is readily conceivable that such a coating will commence to dry upon its exterior first, as that first comes into contact with the air; that having become dry effectually seals the undried portion underneath from contact with the atmosphere so that the oil cannot oxidize and harden or it there be little linseed oil in the varnish, it prevents the further evaporation and hardening of the varnish gum. Be the composition whatever it may be

the results are the same and that is "cracking of the varnish coat." As the dry portion of the coat cannot conform itself to the elasticity of the interior it cracks and this too heavy application of varnish is responsible for much of the cracking of that article.

Always bear in mind that every coat of varnish should be thoroughly dried and hardened before another is applied on top of it, as this is also another cause of varnish cracking upon the same principle as has been explained in the paragraph above.

Quick-drying varnishes, when properly made, are very desirable, but should be made from good hard gums, having sufficient hardness to rub well without crumbling to pieces, as varnishes will that are made where the product of our Southern yellow pine forest predominates as the principal ingredient in their make up.

If a man will and must have a cheap varnish to finish the hardwood work of a house or a piece of furniture, his wishes must, of course, be gratified, as he pays the fiddlers, but such an economy comes very "high priced" in the end. The cost of taking it off and of refinishing remains with him the rest of his days as an object lesson.

Many finishers knowing that quick-drying varnishes are unfit to use for certain exposures, at least, will use them simply because they are advantageous to them in time-saving. When these cheap varnishes are used when there is no necessity for doing so, as when they are not specified, there is no excuse whatever for it. This greed

for saving a few cents has caused architects to take the matter into their own hands and to specify the kinds of varnishes which in their practice and experience they have found worthy and reliable.

Dishonest finishers are partially the cause of this, but honest ones (and they are by far in the majority) have much to gain from it, in that it relieves their responsibility and the same is saddled onto the architect.

Dishonest men will always bear watching, and as honest ones can lose nothing by it, they should encourage the practice rather than discountenance it. They have everything to gain in having a dishonest contractor detected in the "crime" (for it is nothing less) of substituting a poor grade of varnish for one that has been specified. This practice is too frequent and it should be stopped. It is not receiving the scorn and abhorence that it should. Even high-toned supply stores wink at it, afraid to say anything when some of these wormy customers of theirs openly come to their places to buy some cheap hard oil and have their labeled cans of high grade varnish filled up with the cheap stuff. Sometimes these customers make no bones of it and tell them right out, usually laying the blame upon having had to take the work too cheap and of course that they must come out ahead somehow. If what has been said in this instance is true, it is in order to stop the nefarous practice. It is not just to the honest bidder who has to bid against men who are bound to come out "ahead" nor is it just to the

varnish manufacturer whose reputation is made to suffer unjustly by this "substitution racket."

VARNISHES.

It is not intended here to give the reader instructions for the manufacture of varnishes, for to do so requires appliances far beyond the reach and possibilities of the average wood finisher or manufacturer of furniture, for that matter. The processes are very intricate and would be out of place in a work of this kind. But while there is no necessity to-day, for the finisher to make his own varnishes it is well that he should know a little something about varnishes, as no workman can ever know too much about the material he continually uses. This elementary knowledge will enable him to make the right choice of a varnish for the right place.

Varnishes are made from resinous and gum-resinous substances. Some are soluble in alcohol, some in turpentine or other vegetable oils and some again in the fixed oils such as linseed oil and poppy seed oil, etc. These liquids are called the vehicle and according as they enter into a varnish make these quick-drying by their quickly evaporating away as when composed of alcohol or the volatile oils, or slow-drying if linseed oil is the solvent. A mixture of these vehicles will consequently be quick or slow in the proportion that either the volatile oils or the linseed oil predominates. There is another reason for a varnish being slow or quick besides that of the composition of its solvents or vehicle,

and it is that of the resins and gum resins that the varnish may be made of. Some of these, as will be seen, being very much quicker in becoming hard than others.

Of the gums that are soluble in alcohol, shellac is the only one that will be considered, for it is the only one that is worth the while, mastic, gum benzoin etc., which were formerly used as additions in connection with Lac in making spirit varnishes, having been totally discarded to-day as adding nothing whatever to the value of the varnish and frequently of reducing its value for French Polishing. Gum mastic and sandarac are sometimes used for special purposes, such as polishing violins, but even there their use is mostly empirical and it is very questionable if the same results could and would not be obtained by the use of shellac spirit varnish alone unencumbered by any of these.

Of the other resins used in varnish making, and which are soluble in oil or turpentine, the main one and that which stands at the head of the list for either durability or brilliancy, is the resin known falsely under the name of gum copal. This article comes in many qualities some of it being very clear and transparent, other specimens ranging from light to very dark. All these are valuable for some kind of varnish making, the lighter being selected for fine clear, transparent, light varnishes and the rest according to their coloring for secondary and inferior grades. This resin-gum is head and shoulders above all others on the list for manufacturing a lasting

varnish and such grades of varnish as wearing body are made from it in the main. It solidifies very slowly after having been once liquefied and made into a varnish, and that is its worst fault. It seems that there is no perfection to be had in nature without a corresponding drawback.

To correct this slowness of drying is one of the chief aims of the varnish makers, and their best efforts are directed to that end.

But few varnishes are being made where copal is the sole constituent. Additions are made of other gum resins which serve both as a cheapener and as a corrective to make the varnish dry more speedily than it would otherwise. Of course this compounding adds nothing to the wear or lustre of the varnish, but for certain purposes it is an improvement. For interior work, which is not exposed to the action of the elements, it certainly is. The other gum-resin substances employed in making the varnishes used by the wood finishers are gum animi (so called by the number of insects that get caught into it during its excudation), gum kauri, which is probably more used than any other gum unless it be gum Rosin.

The latter, of course, should never be employed in varnish making, and probably would not if people were only willing to pay a fair price for an article properly made. But as long as people want to buy gold dollars for ninety cents, a $20 suit of clothes for $14 99, a $3.50 varnish for $1.98 and everything else in the same way, they

must expect something else besides hard gums in their varnish.

Nearly all varnish manufacturers try to make at least one good varnish which they recommend as an outside varnish under various names. These are usually slow dryers and will not bear rubbing for eight or ten days and sometimes even for two weeks, according to the barometrical conditions of the atmosphere and the height of the Fahrenheit. They also make one which is intended for inside finishing, and which will rub in three to six days according to weather. Many of these quicker varnishes are very good, rubbing down well and are fairly durable as well as lustrous.

For interior work it is not necessary that a varnish should be composed of as hard and slow gum-resins as for outside use, but even for this purpose gum rosin should be excused.

For very cheap finishes over pine and where the use of high grade interior rubbing and flowing varnishes would be considered as too expensive, the so-called ordinary "hard oil" finishes can be used with fairly good results, although there are cheap varnishes that could be named that give equally good results and that cost less. For pine finishes No. 1 coach and Extra No. 1 coach varnishes also give fairly good results, when well made.

The so-called copal furniture varnishes do not contain an atom of gum copal, and are so cheap that one may

well doubt if anything else but rosin was used in their manufacture.

As a description of the various gums, with their full history, can be obtained by consulting any encyclopedia and a rehearsal of it would swell this manual far beyond the limits intended for it, the reader is referred to these for fuller information concerning them.

CHAPTER XI.

RUBBING.

This operation follows varnishing and may be done after the first coat of varnish has become thoroughly dried and has been put on heavy enough to fill up all the depressions etc., to a perfect level. This, however is seldom possible, notwithstanding all the care that may have been taken in the preceding operations of filling and shellacking. It is only possible upon very close grained woods, such as birch, sycamore, maple etc. Even in these it is better not to depend too much upon a single coat of varnish, as a very small speck will cause an elevation that cuts through in the rubbing and the appearance will be spoiled. As to the coarse grained woods it is absolutely impossible to rub on one coat of varnish and two or more are necessary to give the wood such a surface as will safely rub to a perfect level without risking to cut through to the bare wood during the rubbing process.

Seemingly rubbing is a very easy affair, and in a certain way it is, yet in this as in varnishing there is more in the "art" than appears in the looks, a good rubber doing his work much quicker and better than one who has not acquired the knack.

Below are given a few rules that will enable an inexperienced person to do a fair job of rubbing:

1. Avoid rubbing crosswise of the grain as this gives the work a scratchy appearance.

2. Do not let your strokes bear heavily at the beginnings nor ends; if you do you will rub the wood to an unsightly bare spot on the edges.

3. Always rub with the grain of the wood, up and down, lightening the stroke at either end.

4. Never attempt to rub until the varnish be thoroughly dry, for if such a course has been pursued, it will be sure to sweat through and it will have to be rubbed over again when dry. Bear in mind that there is nothing gained by hurrying but a "loss of time" as our Irish friend would say it.

5. If the varnish resists the impression of your finger nail it is safe to rub but not before it has attained that degree of dryness.

If the above few rules are followed, there need be no fears of making a failure of rubbing down a well varnished surface to a level.

Rubbing is most usually done with ground pumice stone of which there are several degrees of fineness: FF, F, 0, 0½, 00 being the sizes mostly used. FF, and F, are the finest, 00 being the coarsest. The finer grades of pumice do not cut as fast as the coarser but they are safer to use in the hands of beginners or for careless old hands too, as there is less risk of scratching incurred than in using the coarser grades.

Rubbing requires a great deal of elbow grease for

some kinds of wood. For instance such woods as cypress. Before rubbing be attempted over that wood three or four and in some cases as many as five coats of varnish should be applied and even then sometimes it will be insufficient. This is due to the composition of the fibres of that wood. These are so tenacious of the circular form of their make-up that it can never be planed so perfectly level but that they manage to come up some way or other. This is the only one exception, however, and most other woods will only need the application of two, and at most three coats of rubbing varnish before the operation of rubbing can commence safely.

The other one thing necessary for rubbing, besides powdered pumices tone, is a pad with which to rub it over the wood.

This pad is simply a chunk cut out of a sheet of "rubbing felt." Usually it is 3x5 inches and may be cut out from any size of thickness of the felt as will best suit the fancy of the rubber. This or even 4x5 inches are the proper sizes for rubbing flat surfaces such as panels or stiles. For mouldings it is better to prepare some pieces of wood to conform to the curve of the mouldings, and to split some of the pieces of felt if thin felting is not at hand and to glue these pieces of felting to the pieces of prepared wood. The curves will then be as easily rubbed as the flat surfaces.

Rubbing can either be done with water or with rubbing oil. This is a petroleum product resembling and

smelling like machine oil and which is much cheaper than linseed oil, which can also be used, but as it is more expensive and no better and on account of being more gummy it is even less desirable than the "rubbing oil."

The most common practice is to dip the piece of felt into the rubbing oil and then into the ground pumice stone, lifting a sufficient quantity of that article to the surface about to be rubbed. Some again apply oil directly to the surface, sprinkle the pumice stone upon it and proceed to rub with the felt. This is all right when the surface to be rubbed can be placed in a horizontal position, but on perpendicular work such as upon the interior woodwork of a building, this method becomes impossible and the first described process is the best and really the only possible one.

One should never delay the cleaning off of the oil and pumice as soon as possible after doing the rubbing, so as to prevent the rubbing oil from soaking into the varnish and softening it.

One can readily tell whether a surface has been sufficiently rubbed, by wiping off a stroke with the palm of the hand. The pitted appearance should have disappeared and a perfectly level surface should show up.

Cleaning up is a very particular piece of work and requires care and attention more than skill. Conscientiousness in doing the work is the one quality which is most desirable in the operator, as it is very easy to slight the cleaning in some of the mouldings, corners or quirls

of the carvings, in "out of sight" places. Should the job be polished after the rubbing as is most usually the case, the particles of pumice stone that have not been cleaned off are pretty sure to find their way to the surface to scratch and mar the job.

It is usual to take damp soft wood saw dust to clean off with. This dampening is to keep it from scratching. The mouldings should be carefully gone over with the pickers, same as described under the heading of "fillers." After the woodwork has been carefully sprinkled over with the sawdust, clean off with soft cotton waste, or better still with soft cotton wadding. Split the wadding in two and use the soft side to wipe with. It is particularly well adapted to getting into the mouldings with a pointed stick. Its soft inside surface after splitting will absorb all remaining oil and specks of pumice and leave the wood in condition for either a dead finish or a polish finish.

CHAPTER XII.

POLISHING.

In the previous operation of rubbing the work of wood finishing has practically been brought to a close in so far as the system of finishing woods in varnish is concerned as practiced in ninety-nine cases out of a hundred as against the finish called French polish which will be reviewed later on. This really ends the method of finishing after rubbing. It is true it can be further developed, but it is practically complete in that, let it be either good or bad, no remedy can be now applied, for if bad it is too late.

The wood can be left to a dead polish and for the interior finish of wood work this is as far as it is necessary to go. This dead level, mirror-like finish is very fine and is much preferable for most purposes than the same surface polished, but as a polished surface is insisted upon by many persons, and architects specify accordingly, and for furniture articles it is indispensable as well as desirable, this dead leveled varnished surface has to be "polished" to bring it to a lustrous condition.

There are two processes of bringing this about—the quick and the slow.

The quick is as follows: Take a handful of raw cotton that has been dipped in a mixture of half sweet oil and half alcohol—well refined cotton seed or peanut oil

will do if sweet oil (the genuine) is not readily procurable, and rub the job with a rotary motion.

In a short time the lustre will appear and one that is skilled in it can produce very fine results; yet there is a better way though more lengthy and that is called the slow process.

This is the method: After the work has been brought to a dead level by rubbing put on an extra coat of flowing finishing varnish; rub this down again with FF. pumice stone, clean up carefully; then take a lump of pumice stone and rub thoroughly, or with a chamois skin rub ground rotten stone over the work with a circular motion. The rotten stone should dry on the surface. When dry, with the palm of the hand wipe it off the work, keeping the hand going in a rotary motion. The hand must be wiped every time it has passed over the work and for the purpose one should have a piece of cloth in the other hand. An old piece of silk cloth or handkerchief answers very well for the purpose of rubbing the rotten stone, should it be handier than the chamois skin.

This completes all there is "in wood finishing" and while in one sense this finish is inferior to what is known as French polishing, it is so in so small a degree that it is very difficult to distinguish one from the other and even experts can be deceived in it.

The claim made for French polishing that it is superior on account of wearing qualities, etc., is not well sustained. It is only under certain conditions that it is the

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case, but under others the rubbed polished varnished surface will outwear the French polish so that it is as broad as it is long. When it is taken into consideration that the cost of finishing even in the costliest manner employed in varnish rubbed polishing is considerably less than half what it would be in French polishing, it is very easy to see why the former has practically displaced the latter. That the people at large are satisfied with it is the best answer to give to those who still advocate the latter.

CHAPTER XIII.

FRENCH POLISHING.

This finish can be put on in two different ways. First by taking the wood from the cabinet makers in its raw condition, if it may be so termed and the operation commenced at once or the operation can be delayed and commenced only after the surface has been filled and cleaned off.

To cut a long rigmarole short, the process of French polishing can be stated in a few words to consist of: *The gradual filling up of the surface of a piece of wood by an alcoholic solution of shellac until the same is brought to a high polish by rubbing.*

While the statement of what the process really is, occupies but a little space to tell it and at a first glance it would seem to be much easier than the processes which have been described in preceeding chapters, in reality when all combined are but "child's" play along side of this simple looking affair.

As some finishers do not believe in the wood being filled previous to applying the French polish, and think that the whole process should consist of the same substance as the finish it will be well to notice the operation from the raw wood.

Of course the same conditions exist here as have been stated at length elsewhere. That is, the pores of the wood

are just as open and have to be closed. If the wood is off in color it has to be stained in the same way as has been recounted in the chapter on staining and stain, and that previous to commencing the French polishing.

To commence with, let us consider what appliances are necessary for the purpose of its application, as brushes are perfectly useless for the purpose.

It has been said that all there was in French polishing was the filling and bringing up of the surface to a brilliant polish by the application of shellac. (Under this name the alcoholic solution of shellac known as shellac varnish is understood, and that article will be understood when the word shellac is used in this chapter).

Shellac applied to unfilled wood will sink into the pores and disappear, and if applied with a brush will remain upon the surface of the fibres as well as sink in the pores so that a succession of ridges would be the result. As this would mean the death of the finish and the utter impossibility of a perfectly level surface other methods must be resorted to to obtain this result.

Before explaining the mechanical processes of "how the work is done" it will be well to consider a few principles that when well understood will greatly aid a novice in comprehending the "why and wherefore" of the operations described.

It must be understood that spirit varnishes become milky and opaque in damp atmospheres and in cold ones also, so it will be necessary to artificially raise it if it

should happen to be that the thermometer should register less than 65° to 70°. The latter is about the minimum at which it is safe to proceed.

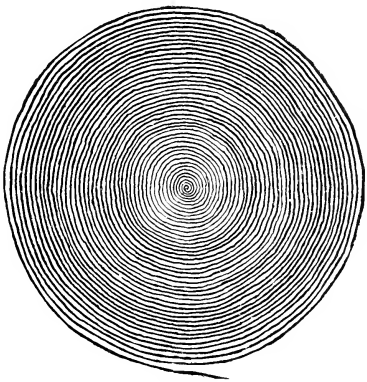

Fig. 16.

As the thinner the film of varnish used the better are the results, it is necessary to apply the shellac in very limited quantities, and the same can only be done by rubbing it on and in.

For this purpose it is necessary to make a pad. That there are different ideas as to how these should be made is to be expected and it will not make so much difference in the end if the general principles of French polishing that will be laid down are well understood.

To make a rubbing pad suitable for flat surfaces tear strips of woolen cloth from 1¼ to 2 inches wide, roll it up to such a size as will best suit the work on hand and tie it in the center in the shape represented by Fig. 16 which represents the bottom view of the pad, and by Fig. 17, which represents a side view of it. A single thickness of soft linen or cotton cloth

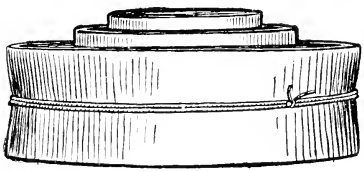

Fig. 17.

from which the sizing has been washed off or which has been in use and washed several times until it is soft, should be put upon the face of the rubber and the edges simply drawn over the top and used as a handle when grasped by the hand.

This form of pad as has been previously stated is very useful for flat surfaces, but for them only, as it is impossible to reach into the curves of mouldings with it.

Another form of pad which adapts itself to shapes that are curved but which is also largely used on flat surfaces, is very easily and simply made by taking the very finest of cotton batting, making it up into a ball and covering it over with one thickness of either soft linen or soft cotton rags, as will be noted further on. Grasp the covering in the hand and it will serve as a handle to propel the pad over the work, but do not tie it.

Be careful to avoid the creasing of the rag covering of your pads, as this will greatly hurt their efficiency and the freedom of their working, besides giving the coating of shellac a smeary appearance. Some workmen prefer to take wadding and with a sharp knife carefully remove the glazed sizing on each side of it; they then take the soft interior for making their pads. The main object is to get a perfectly soft cotton, and the highest grade of cotton batting is good enough for most purposes.

Small pad rubbers are usually held by the thumb and the tips of the fingers but the larger ones require the palm of the hand to be used in propelling them over the work.

The requisite now is to charge the pad with shellac. For doing this open up the covering of the pad and drop the shellac on the wadding from a bottle through the cork covering of which a goose quill has been placed. This will enable the operator to have full control of the amount which he applies upon the wad, which, let it here be well understood, should never be large. Only enough to dampen the wadding should be applied and it should never appear through the rag covering except when it is pressed. This is very essential as will appear later and all novices at first err in that they try to apply too much shellac to their work at once.

If it be dark colored wood that is being polished the orange shellac is good enough to use, but when such woods as holly or maple or other very light wood are being treated, only the white shellac is admissible, as otherwise these light woods would be discolored and rendered yellowish toned.

As the covering of a surface that has not been filled is now under consideration it will first be gone over with a slightly dampened chamois skin to remove any dust that may have settled upon it, and after a short time has elapsed to allow any dampness present to evaporate, take the pad filled with shellac in the way and manner described previously and proceed to apply it to the wood. As the first operation necessary is to spread the shellac about equally over the surface, rub the pad back and forth over it in such a way that each subsequent stroke will

partly cover the surface just gone over in some such way as shown in Fig. 18 rubbing across the grain. After having gone over the surface, immediately proceed to rub it by a series of circular motions over and over again until the shellac has evaporated and been entirely squeezed out of the pad. Occasionally apply a few drops of raw linseed oil to the face of the pad so that the rubbing can proceed without sticking. The linseed oil acts as a lubricant only and but for this purpose would be uncalled for. Even the little that is used must be entirely gotten rid of before the polish will appear, so it will be easily seen that only the least quantity possible for the purpose intended must be used as this will cause a great deal of additional work to remove it from the job, as will be seen during the process known as "spiriting off," in contrast to the operation just described which is called "bodying in."

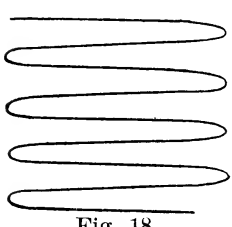

Fig. 18.

The novice must be guarded against ever letting his pad rest even for a second upon the surface being rubbed. From the time it is placed upon it, let it be kept constantly in motion. When it becomes necessary to stop let the pad be lifted in a sliding way upward off the work. If the pad is allowed to rest for the least bit of time it will stick and that will make a break upon the surface which should have a perfect level. It will require probably hours of hard work to remedy the neglect of a moment.

As the rubbing pad dries up from having become exhausted of the shellac it contained, more should be applied to it in the way and manner described previously, being very cautious to use it sparingly.

A partial polish or gloss will show up while the shellac is being applied and it is still wet, but this soon disappears in the drying as this substance sinks into the pores.

After the piece of work has been gone over and rubbed with the circular motion sufficiently it should be laid aside to thoroughly dry which will take a day to, make a surety certain. These applications of shellac and rubbings must be continued as long as the job continues to absorb material. It is impossible to tell the number of applications necessary to bring the operation to a finish, as this depends on both the wood and the operator. As the center of a panel is likely to receive more attention than the edges are, one should be cautioned not to overlook these and never to slight them, as it is bound to detract from the appearance of the job.

Towards the latter end of the operation of French polishing, the use of too much oil during the former rubbings can readily be seen and felt under the rubbing pad, as the shellac softens and does not take hold properly and the surface will feel pitchy. To make a long story short, keep applying and rubbing the shellac till a thin film of it remains upon the surface of the wood without any further sinking in or disappearing.

The same process must be used for surfaces that have been filled before the application of the shellac commences. It shortens the duration of the process considerable, and is the rational manner of executing it for people as busy and go-ahead as the denizens of the New World are, but if, as was said before, a person is willing to pay for it, he should have it the other way by all means.

After the thin film of shellac has appeared to stay upon the surface of the job it is ready for the finishing process which is called

SPIRITING OFF.

The operation called spiriting off is very similar to that of bodying in as the method of application and rubbing is the same in the one as in the other with this difference that instead of shellac being used, alcohol is added to the shellac at first in a limited way and increasing the quantity each time until the final rubbing is done entirely with alcohol.

Spiriting off is resorted to to remove all oil that may be present upon the job, as no polish can take place as long as a vestige of it remains. Rubber marks and other smears are also reduced to a perfect level by this operation.

At first the proportion of alcohol added to the shellac used in rubbing should not exceed one-fourth of the bulk of the latter. In the next it may be one-half—in the next

three-fourths, and so on, reducing the quantity of shellac used gradually until pure alcohol is used.

When the stage of the work has been brought to where pure alcohol rubbings are applied a clean rubber only should be used. One should be very careful, as too much wetting of the surface with alcohol would soften the shellac and wash the body put there by the former process of bodying in, and all through the operation the workman must exercise great care not to let his rubber remain upon any portion of the work.

While bodying in the covering of the pad should consist of but one thickness of the linen or cotton rag used for that purpose; in spiriting off, three or four thicknesses should be used, and the same care must be taken to remove all creases and folds as in the former. As fast as the outer covering of the pad becomes dry, that one should be removed. When the next one dries, remove that also until the last, and when this one has dried remove it, charge the wad over and commence again.

The motion of the pad is similar in spiriting off to that in bodying, except that at the latter end of the process the rubbing should be done with the grain of the wood, and the last one must be so done.

While it may seem easy enough to do spiriting off, from reading of the process, there is no operation in French polishing that requires so much careful attention and experience as this does, and novices seldom succeed in making a success of it at the first attempt; neither do

they at the second. Time and practice alone will enable a man to thoroughly understand how to apply and rub properly, and while it is not the purpose of this writing to discourage anyone from undertaking it, it should be done at first with small articles of little or no value for practice, as articles of value are sure to be ruined. Until experience has been gained it is better not to undertake large surfaces at all, as only those of long experience can ever treat them successfully.

As it has been said at the beginning of this chapter, French polishing is too slow for Americans, and as fine or nearly as fine a polish is produced by the much safer and faster methods of varnish rubbed and polished. French polishing may be said to have nearly disappeared although, in some parts of the country it is still adhered to but in a very limited way. The name even is being transferred to varnish-rubbed polish work, and is used frequently by architects and well-posted men to denote the latter process of finishing. So no person need feel very sorry if he has been discouraged by reading the warnings given immediately above. Some may not become French polishers, and still become very good varnish-rubbed finishers and do all the work that will present itself and never know a thing about the so-called French polish.

A volume of details might be added to the above, but such minutia of details would only confuse one more than they would serve to enlighten him. The above contains all the essentials necessary for French polishing and will

suffice to enable one to "try it" if so inclined. Even as short as are the details given, the space occupied by them

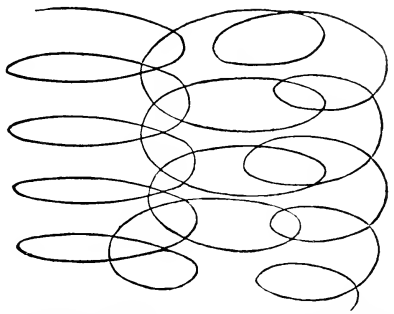

Fig. 19—The Motions in French Polishing.

is greater than should have been given, when it is considered how little of the work is likely to be done.

CHAPTER XIV.

WAX POLISHING.

In the introductory chapter it was seen that previous to the introduction of "French polishing," and later of "varnish-rubbed polishing," wax polishing was resorted to for finishing furniture and the ancient oak woodwork finish wherever such was used, in dwellings. That its time of usefulness for such purposes is over is a certainty, but for all that it has a place to fill even to-day, and this wax polish has outlived all the other systems in use for it is still practiced extensively.

Wax polishing has much to recommend it. It is in the first place easy to apply and to keep in good condition when through some cause or other its finish becomes marred. Secondly, it costs very little. On the other hand it is unsuited for the purposes for which it has been displaced by a varnished-rubbed polish. For furniture it is too easily marred by friction or knocks and is not nearly so brilliant as the former, nor has it that hardness and dry feel and freedom from stickiness; neither will surfaces wax-polished stand any dampness or wetting, as this is sure to destroy the polish.

Oak seems to be the kind of wood that shows up best when wax-polished. The subdued polish it produces seems to be just the thing for it. Where a semi-gloss finish is wanted, it would seem to be the "polish" indicated

for that purpose; and it is, but for the drawbacks indicated. Any mishaps are, however, so easily remedied and repaired that one may often wonder why there is no more of it being done than there is. In rooms where there is constant knocking about of the woodwork, or where a high polish is wanted, it is easily understood why it is not used, but in all situations free from dampness and knocking about where an egg-shell gloss finish is wanted, it may be used to good advantage.

For floors wax polishing it is used more extensively than for any other purpose, and justly so, when it is considered that varnish, no matter how good it may be, must necessarily wear off unevenly upon a floor, as at the entrance of a room or its exit near doors and between them a path will be made in time. The quality of the varnish only makes it a question of time as to how soon this will take place. Every finisher knows what it means to go over such worn out places for either touching so it will match the rest of the room or for giving the whole room a coat that will not permit the worn out parts to show through it. It is here, then that wax polishing is at its best. It mars easily, it is admitted, but it repairs just as readily, and no one can ever tell where the repairing has been done.

The most serious objection to the use of wax polish is that it requires constant care to keep it in good order. So it does; but the time required to repolish it is so little! A person with a weighted brush can go over an ordinary

room, especially if it has been waxed several times before, in a few minutes—very little longer than it would take to sweep it.

The process of wax polishing is very simple. Take beeswax, cut it up in bits and digest it in sufficient turpentine to make either a thick or thin paste of it, as will best suit the ideas of the operator. It will make no difference in the end, the vehicle disappearing entirely by evaporation, and being only used to enable one to spread it more evenly. It takes some little time for the turpentine to dissolve the beeswax, but the process of solution can be hastened by the aid of heat. One should be careful not to subject the turpentine to open flames, nor to get it so hot that it will boil over, nor to heat it in a close room where the inflammable fumes might catch fire, nor to cover the vessel so closely that the vapors cannot escape. Ordinary caution must be used to guard against an accident, and these warnings need hardly have been given here, as probably ninety persons out of a hundred who will read these lines know how to handle that article.

This can be applied any way so it is gotten upon the floor. This is the one thing that is absolutely essential. It is true that it will be better to apply it with a brush the same as varnish, as this will leave it even and it will not require so much brushing to polish it level. If it be new work that has never been wax polished before, the first coat acts as a filler in leveling up, and only a very slight polish will appear upon it after it is brushed to a polish,

so it is better to go over the surface again with another coat before there is any attempt made at the polishing. Before the second coat is applied the first should be dry. This will take place very rapidly as the vehicle is very volatile and will speedily evaporate. The windows should be open, if the work is done in the summer, to allow the fumes to escape and assist in quickening the evaporation. In the winter this is frequently impossible, and it takes a little longer waiting for the complete evaporation to take place. After the evaporation has been completed the brushing can commence. Any short-bristle, stiff brush will do, if made up somewhat like a horse brush but stockier. A good horse brush answers fairly well for small work, of course, and for polishing surfaces others than floors. For these a weighted brush is made which greatly accelerates the process, besides relieving the muscles of the operator. Fig. 15 illustrates the weighted brush. It has a long handle, and the operator pushes it back and forth until the surface is sufficiently polished, which will be in a few minutes. Where the surface has become worn or marred from any cause, it is very easy to remedy it by the application of another coat of wax and rubbing it to a polish and no one is the wiser for it as it will not show any patching, which is next to impossible with any other finish.

Subsequent rubbings have to be given to keep waxed floors in order, and in Europe many of the waxed floors are taken care of by contract for a stated sum, which in-

cludes a rubbing each week or every two to four weeks, according to whether the rooms are used frequently or little. Some shops there have men who do nothing else but care for waxed floors, and again some go about securing the contracts to take care of floors who are not connected with any shop, but who make a specialty of this kind of work. Again, in some houses, it is expected that some of the servants will do this, but this is very seldom, as it requires more muscle and strength than is usually possessed by women, and where a few possess the strength they lack the willingness, so that the discouragement from waxing floors, on account of its throwing work out of the hands of the painters, is not a good reason to give.

CHAPTER XV.

OIL POLISHING.

Linseed oil polish is probably the most ancient of any of which there is any knowledge. It is one of the simplest, and at the same time one of the most difficult to produce. Any one can produce it, but few will ever care to undertake a second job of it, if they can avoid it. For certain situations it is the only finish having a polish that can be relied on. For instance for table tops and bar counter tops. The great difficulty, or rather the impossibility, of producing a finish by either varnish-rubbed polish or French polish that can be depended upon to stand hot dishes and hot liquids makes oil polishing a necessity. Neither varnish-polished nor French polished finishes can stand very much of it, and continual wetting and slops will in time ruin any of those finishes, even when the liquids are cold. Oil polish will stand all this and remain in good condition.

The process of oil polishing is a very simple one. Apply either raw or boiled linseed oil upon the wood, not too much but about what the wood can absorb and be worked in by the rubber without leaving any surplus on it, and then rub—rub—rub, (it takes no end to it) with a rubber made of a heavy block to which has been nailed a piece of felt, or a piece of felt wrapped around a square stone. Anything, in short, that has weight, for the

weight relieves the operator's muscle from the too-fatiguing exertions that would otherwise be necessary to propel the rubber with sufficient force. It is well to let the piece of work alone for a few days after the first rubbing, then take it up again and continue the operation described till a sufficient and satisfactory gloss is obtained, which will be in two or three months. In fact the finishing is never ended—in so far that it can never be rubbed so much but that another rubbing will not make it look better and it can never be hurt by too much of it. The process is too slow and expensive for America and will never become popular, although for the purposes indicated it should be used more than it is and where people are willing to pay for the best, they should have it.

CHAPTER XVI.

SOFT WOOD FINISHING—WHITE PINE.

Soft wood finishing does not differ very materially from hardwood finishing and the same general principles which apply to this govern that also. Stopping the suction of the pores is as essential for these as it is for the others, as no penetration must take place. The same care must be taken in cleaning and preventing the flying about of dust and the same sort of treatment given as for any kind of finish that is applied to woods. If the hardwood be a close-grained one the similarity of treatment is still greater; so that the difference is mainly in the fact that a cheaper finish is usually employed over pine.

White pine is about the only wood that comes in under the designation of soft woods. This is rather arbitrary, as has been seen, but the custom holds among lumbermen and dealers and in a certain sense pine has peculiarities that belong to it alone. It is a close-grained wood, yet it is soft and absorbing. It can be colored to represent any of the higher priced hardwoods, but on account of its lack of boldness of grain, its appearance when so treated proclaims an imitation on the face of it. However, as this wood has little grain to show the staining of it in any of the pleasing colors, which make no attempt at the imitation of any particular wood, are in order and very useful and beneficial.

Either water stains or oil stains can be used. Water stains, however, will be more difficult of application, for they seem to sink away out of sight as fast as put on, and if one has the mishap to touch over any part of the wood that was already touched by the previous brushful it will surely show a lap. Besides, if one should happen to lay it on heavier in one part than another it cannot be brushed out, as that will make it worse than before. Oil stains made of any transparent colors in oil, finely ground, and thinned with turpentine, can be brushed out the same as paint and a much more uniform surface can be obtained from their use. Besides they are so much easier to apply.

If the staining be done before the filling, one should be very careful to rub it out so thin as not to make a film of it upon the wood, and to make sure of this the wood should be gone over after the staining and all surplus stain should be removed from it by wiping it with a woolen cloth. Oil stains do not dry as rapidly as water stains and usually require twenty-four hours of drying before the filling is applied over it.

The filling is usually done with a liquid filler. There are many of these manufactured ready-made, for which much is claimed. The most usual is that it is as good as shellac varnish and of course that it costs much less. Some of these do stop the suction very effectually, but others again not so well. Not that the suction is not stopped by any of them so that one coat of varnish will bear out upon it, but that in time the decay of the glue or

the chipping of the rosin in their composition affects the coats of varnish disastrously. The above is not written to discourage anyone from using a good liquid filler which they know is all right by their own experience or that of people in whom they can place confidence, but for the purpose of putting them on their guard in the buying of liquid fillers.

For filling over pine there is no question among finishers but that shellac varnish is as good as anything that can be used. The cost is the only item that prevents the exclusive use of it. The grain alcohol shellac, being very high and the wood alcohol shellac itself also higher than the ready prepared liquid fillers, besides being very disdisagreeable to some people on account of its pungent smell.

The orange shellac stains pine to a beautiful tone of yellow, and frequently inside blinds made of pine are left in that finish. It requires somewhat of an expert, however, to make a good job of this so as not to show laps or doubling over. The proper way to do this is to thin your shellac rather thinner than you would want it for ordinary shellacking over a flat surface. Mr. R. A. A. Bahre gives his method in *Painting and Decorating*. As it is a very good one it is reproduced here:

Having in view the fact that the wood is very soft, he will dilute his lac somewhat with the spirits, to make it work free. Then with a double-thick flat-chiseled bristle brush about two inches wide he will apply a very free

coat to the closed slats on the bar side, including the small ogee edge of the frame, taking care to daub none on the flat surface. Then quickly turning to the other side and opening the slats he will finish and lay off the sides, and again closing the slats, proceed to coat them upon the plain (non-bar) side, including the other edge of the frame. He will then return to the bar side, open, lay off and finish; then running the brush up and down the bar complete that portion of the work. It may be laid down as a rule that one section should be completed before another is started. When one portion is coated proceed with the frame by coating the outside edges and then the center rail, cutting the joint clean. Then begin at one end of the stile and follow around until the starting point is reached being careful to always complete as you go on.

"It is sometimes required to finish shutters in a hanging condition, but on account of the speed required in applying the shellac, there is much danger of spattering the walls or windows. If, therefore, they are hung with loose joint butts, it will be found economical to remove them and to finish them in a separate room."

We have thus far referred to the shellacking of pine shutters with orange shellac. If one has acquired proficiency at this point, all the remainder will come very easy to him, especially when using white (transparent) shellac, which does not show the laps after varnishing. The whole secret of shellacking may be condensed in adher-

ence to the following simple rules: First—keep a wet edge to work to; second—always work to a joint before stopping; and third—never repeat with the brush after becoming partly set, thereby causing it to "double up."

A very common way to finish white pine where it is desired to leave it in its natural state, is to give it one coat of liquid filler and one coat of varnish or hard oil finish. It is the cheapest way to finish, yet to the mind of many it is about as good a way as any and it is really very pretty, with its modest, non-assuming tone of satinwood, and certainly it is much more tasty than the same surface would be when made to masquerade as black walnut or mahogany.

Two coats of varnish are sometimes used, but it is unnecessary, if the suction of the pores has been properly stopped by the filler. In the cheapest kind of work the suction can be readily stopped by the application of a glue size and a coat of No. 1 varnish. It will in time probably chip off, and surely will, if moisture has access to the work. As this wood has no prominent grain that a high finish could possibly bring out, the high grade finishes are not really necessary, and the cheaper grades are more in keeping with its character.

CHAPTER XVII.

THE VARIOUS WOODS USED IN WOOD FINISHING AND THEIR TREATMENT.

Ash.—White, blue and black are all natives here and are also common to Europe. This wood is also to be found in many other parts of the world. All varieties of it are useful to the arts and manufacturers. It is extensively used in the manufacture of furniture and also in interior finishing. It is very porous and requires the use of a paste filler and shellacking over that to prepare it for any of the finishes. Its grain is straight and rather uniform, but handsome and elegant and well worth developing by the finest of polishing. Its very plainness indicates its use where rare and costly woods are used for panels, as it serves the purpose of making a frame for those and does not detract from their appearance by making a parade of its own. Ash is frequently used now in mixing with oak, which it closely resembles, especially plain sawed oak. When so mixed it is often difficult to tell one from the other, and even those who ought to be experts are fooled sometimes, especially when filled and colored to represent "old oak."

Birch.—Black birch is certainly one of the most useful woods in the whole list to either the furniture manufacturer or the house constructor. It has almost jumped to its high recognition as an ornamental wood in less than

two decades, as men old enough to remember twenty years back will well recollect. Black birch takes on a very fine polish, as it is fine-grained. It has a fine appearance of its own, and takes all kinds of stains well. Its natural color is nearly that of wild cherry, being rather light, so it is usually stained. It makes a pretty imitation of either black walnut or mahogany. By manipulation of the stains, feathered mahogany can be very closely imitated with it, and manufacturers of furniture prize it highly for that purpose. It enters largely in house construction also and would be still more commonly used but for the fact that its cost has jumped so very high that it cannot be employed as much as it deserves to be. All sorts of fine finishes are applicable to this wood. Filling with a paste filler is not absolutely necessary previous to shellacking, and two coats of shellac, sandpapered, will usually bring the surface in the right shape for polishing processes of any kind. Yet while paste filler is not an absolute necessity, it is thought by many finishers, especially if the wood has been stained, that a properly colored filler helps to bring out details that are desirable for some kinds of work. The above can be said of most all the close-grained hardwoods and need not be repeated hereafter.

Basswood or Linden.—This wood is about as poor as any that grows in American forests, and is very seldom employed in house construction, and it is believed, not at all in furniture making, unless it may be for inferior backings, etc., requiring no finishing. It is very porous

and absorbing and would be a stain absorber the same as pine, and the same caution is required concerning the use of water stains with it. It finishes only fairly well. It requires a paste filler. It has little or no characteristics worth noticing.

Beech.—This wood is coming forward and is being used much more than formerly. Why it should have been neglected has always been a mystery to the writer, for it has a beautiful appearance when "quarter sawed" that belongs to it alone, and therefore it has a place for decorative work in both furniture making and interior woodwork finish. Red beech is especially fine, and a good imitation of cherry can be made out of it. All varieties make fair imitations of walnut or mahogany when properly stained. Beech is one of the close-grained woods and requires the same treatment as noted under "Birch" to prepare it for polishing operations. It takes on a good polish, but not so fine as birch.

Butternut—or white walnut, as it is frequently called, is very inferior to its black brother, and is not used very much even to make imitations of its "colored" relative. This is probably due to the fact that it is not very plentiful and not so easily worked up as other kinds of wood that are more plentiful and less refractory to work. It is very coarse-grained and requires lots of filler and at least one, and better two, coats of shellac on top of it to fit it for the finishing, which may be of any kind, as it takes on a good polish.

Cherry.—Our wild cherry is eminently an American wood, as it grows nowhere else in a natural state. It is one of our best woods for many purposes, in its natural color or stained to resemble mahogany. It is susceptible of a very high polish, being very fine and close-grained. A very fine polish will appear upon the bare wood by applying friction alone. It is very much in esteem among cabinet makers on account of its little likelihood of warping, having as little tendency to deviate from the path of rectitude as any of our woods. As one expresses it, "I like cherry because it stays where it is put." It is easy to work and carve. From its close grain filling is not necessary and shellacking it will prepare it for any of the finest polishes.

Chestnut.—This wood is so very spongy, so very easy to split off, and withal so very very open-grained that it is very difficult to fill properly, and for these reasons it is seldom employed in furniture making, but in some sections it is sometimes used in house finishing. Its characteristics all the way through are coarseness. Its fibres run somewhat like ash, only in an exaggerated and more rambling sort of way without the strict regularity of the latter wood and as though it were half ashamed of itself. A good dose of paste filler well rubbed in, with two coats of shellac on top of that, will fit it for such polishing as it is capable of taking.

Cypress.—There are two or three varieties of this wood which are known as light, dark and bald, which

are all useful in house construction for interior finish. As white pine is disappearing and becoming scarcer each year, cypress is made to take its place as far as possible. In many sections of country it is now being used almost exclusively for not only interior woodwork but for weather-boarding and cornice work finishing lumber. It is not affected injuriously by moisture, like many other woods, and is almost indestructible. It contains very little pitch. It has a medium grain with rather convex tendencies and when it is supposed to have been sandpapered smooth it is apt to quirl up again and again, so that it is not one of the ideal woods to finish by long odds.—Not in the estimation of the finisher. Its grain and growth are usually very straight in the trunk of the tree and they have little diversity, but while plain it is pleasing, and where the finishing is simple with no attempt at a high polish, or where it is varnish-rubbed to a dead finish, or where the last or a semi-gloss is produced by a wax polish, it is all right and quickly done, especially with the latter.

But while the trunk is plain in growth the butt cut and the knees furnish a "variegated" grained cypress that has enough diversity to suit the most fastidious. The writer remembers well the interior of a fine mansion in the city of Norfolk, Va., which was entirely finished (at least all the doors) with cypress that had been selected and saved for years at the saw mill of the owner of the house. He had selected all the finest specimens only, and

the panels were equal to burl walnut for unlooked-for variation of the grain, only that there is more straightness of the fibres with little disposition to take to the rounded form. The finishers who had the job in charge were in despair at the fractiousness of the grain to appear after repeated varnishings and desperate rubbings, but generally managed to bring the doors to a mirror polish after about two days of hard work having been spent upon each. So much for this useful wood. Do not try too much nor expect a high polish without having to work for it. Be content with a dull finish, and you have an ideal wood in cypress.

Hemlock—Is seldom used in either furniture making or by house constructors. When it is, it is usually for panel work in connection with pine, as it is entirely too brittle for any other purpose. It is very similar to white pine, and to all intents and purposes of wood-finishing will require about the same treatment as has been explained at length in Chapter XVI. where soft woods are specially treated of and the best methods of finishing described.

Elm.—There was a time that seems very short to-day when elm had little or no recognized value at the sawmills, but that time has passed now and the furniture manufacturers at least use large quantities of it in the make-up of cheap furniture. Some varieties of elm are even much sought after and are high priced. The "rock" elm of Northern Michigan, for instance, brings very good

money to the timber owners who have had forethought enough to preserve the trees until now, instead of thanking some one to cut them down for a few pounds of wild honey and setting fire to them to get them out of the way. It is very coarse-grained and requires attentive filling and leveling up with two coats of shellac on top of that. It a fair polish. It is frequently finished in its natural color, takes and the same colorings that are used upon oak are applicable to this also. See directions given for oak below.

Gum.—Sweet gum, as it is known in many parts. The blue, the black and the white have all been added to the stock of woods used in both furniture making and interior woodwork. All of them are desirable for either purpose. They have a fine or medium fine grain that takes a fine polish and their grain is pleasing by their succession of waves like of lights and shadows, more than by an assertive prominence, as in oak or ash. It is humble and consequently quiet in its effects, and deserves well the place it has taken for best bedroom woodwork finishing, library and all situations where no flourishes are likely to be wanted. On account of its closeness of grain a paste filler is not an absolute necessity, although it will not hurt it. It is suited to many kinds of stains but looks best as itself with a slight stain to accentuate the "lights" and develop the "darks" in it.

Oak.—This is our most useful wood, and it is useful for more purposes than any other without any exceptions

whatever. It would be a sorry day for all of us if by magic it should at the bidding of some genii all at once disappear as Alladin's great palace did, or is said to have done. Little can be said about its use in furniture manufacturing or in house construction that will carry any information concerning the use of this wood in either case as everybody is aware of its extensive employment. This, indeed, is justly so, for whatever of good other woods seem to possess as a peculiarity, oak seems to have a combination of them all, at least in some member of the oak family, of which we are said to have over forty different varieties in North America. There are general characteristics which belong to all, with many variations more or less accentuated and all have some use for which they are better fitted than any other member of the family. The white, red and black oak are the best known sorts and are used for all purposes indicated above. For all that most varieties are only moderately fine grained and some even what might be termed coarse, yet all oaks take a very high polish and look well in it. There is enough diversity in even plain oak to suggest that there is no servility about it; it is essentially a virile-looking wood. When quarter-sawed, its character is completely changed—in looks at least—and beautiful specimens are developed by that method of sawing, and when used for panels with plain oak or ash stiles it is brought out in a beautiful manner. It well deserves the name it bears of being the "King" of woods. Page after page of eulogy might be

written in paying His Royal Highness deserved homage, but space forbids.

Oak, from its medium condition of openness of grain, must always be treated to a coat of paste filler, which must be given it before shellacking. As may be surmised, it is capable of being finished in all manners of polishing. It is frequently finished in its natural color, but it is susceptible of being stained in a number of ways. One of the most beautiful ways of finishing oak is the "antique," and as that is but an imitation of what Father Time would naturally have done for the oak had he been given a chance, it is, for that reason, one of the sensible uses to which stains are put when used to antiquate oak. A natural method of ageing oak has been described in Chapter VI., known as the ammonia process, and need not be given again in its details. Wherever the process can be conveniently employed it should be used. Stains can also be applied to it to obtain an imitation of it, but the lights will come through the stains in anything but a timid, antiquarian way and do not age worth a cent by that process. They will show as bright as newly-coined silver dollars every time. If the object is to enhance and bring out a greater contrast between lights and shadows, the wood should be stained by all means, and that seems to be the desiratum looked for by forty-nine out of fifty finishers. Such glaring finishing, however, is more or less vulgar in the mind of æsthetic people of taste. It seems too assertive, it brings out the "me too" of this beautiful

wood too much. This wood, as has been said before, is full of vigorous virility in its natural state and ought not to be made to parade with a "chip on its shoulders" as a "bully," which is foreign to its nature.

It is preferable to stain oak in any of the colors of the rainbow and then bring the lights out still further by wiping the stain off of them and thus have something that will look pretty without any pretense of trying to imitate mahogany or walnut. A naturally pretty wood is prostituted when it is made to parade as something it differs from as far as the East is from the West in the anatomy of its structure. It is as absurd as, for instance, trying to imitate plain mahogany with birds-eye maple. If imitations are to be made, let woods be used with little characteristics of their own, whereby the proper use of stains to darken certain portions of their surfaces to make them resemble the wood imitated can be at least partially reproduced. Some will say that they are obliged to do so in spite of their better judgment, because Dame Fashion demands it of them. Finishers should argue with architects and only lend their help to the debasement of "King Oak" after all efforts to prevent it have failed.

Mahogany.—There is probably as much contrast between this wood and oak as there is between white and black—in looks, structure and general characteristics. They have nothing in common, except one thing, and that is that neither is capable of passing for anything but what it naturally is. Mahogany is rather a feminine look-

ing wood, or rather its qualities—some of them at least—rather pertain to that gender. It is tasty and good looking and does not seem to be ashamed of it either; it takes it coolly and does not seem to be conscious of it for all that it knows it, and in this it differs somewhat from some members of the feminine sisterhood. It looks cosy and smooth, is improved by color and by age (another point of difference from those of the feminine persuasion) and it can't talk back. It is coarse-grained, not regularly nor too coarse, however, and requires filling to accentuate it and bring out its fullness of detail. The filling should be colored with Italian burnt sienna, and after the filling it should receive two coats of shellac.

There is considerable difference in the several varieties of mahogany. Some of it is naturally of a beautiful cherry red tone and others again are nearly white and rather insipid if not artificially colored. Some of it is rather soft in texture and again some has very little grain to show—in short this wood shows a great deal of variation and it is the prerogative of the finisher to so stain it and color it as to develop its beauty. Of course feathered mahogany is the form of this wood which is the most esteemed, and when possible this feathering must be imitated. This can only be done by the application of the stains with a camel's hair brush and going over the work with it in such a manner as to imitate the feather. It is in reality "graining" on the natural wood. Some beautiful imitations of feathered mahogany are made thus. The art is not very

difficult to acquire, all a person needs to have is an intimate knowledge of the habits of growth of the real article, and suitable tools and materials. Staining to imitate nature should be the purpose in view always. While feathered mahogany is very fine for panels, it should never be used for stiles. A plain mahogany is preferable for the same reason given before—that their very plainness serves to enhance the delicate tracings upon the panels and serves as a picture frame does to a picture, to hold it and to show it up. All kinds of mahogany are susceptible of a fine polish and are so elegant, so beautiful and gentlemanly-like, that one feels somewhat elevated after gazing at it; especially if the it be a receipted bill for an article of furniture made out of the solid wood. Mahogany grows to a richer tone by age and the process of nature can be hastened by the ammonia process described for oak. It is in fact applicable to all kinds of woods that are beautified by age.

Maple.—We have many varieties of maple differing very much from each other. Soft maple, for instance, is so much different from birds'eye that one would not recognize it as belonging to the same family. Soft maple has little to call one's attention to it. It is coarsely made up, does not show up much of a grain and is seldom used for either furniture or house finishing. Its time may come some day for a cheap finish, but it will be a long way off, it is hoped, as only a scarcity of the finer woods can ever bring it into favor for such a purpose.

Hard maple, and the specimen from it which is known as bird's-eye maple, is what we may call the "prettiest" wood that grows in North America. It cannot be gainsaid. If oak is king, maple is the queen of our woods. Its soft and delicate tracings are elegance itself and while it does not possess the richness of color that makes mahogany what it is, it is far richer than it in its grain. While the birds'-eye is the most beautiful form of hard maple—all hard maple lumber is of good form and veining. It is chaste and modest in the extreme and built somewhat upon the violet order; sweet-scented but unobstrusive to view, one having to look closely at it to discover all its hidden glories. There is a feeling of repose and content produced by looking at a good specimen of bird's-eye maple that eminently fits it for bedroom furniture, and manufacturers have not been slow to use it for the purpose. It is emblematic of innocence and is eminently fitted for the furnishings of a sweet darling daughter.

Hard maples are close grained woods and need no filling, as it should always be finished in its own color, and that not darkened but kept as light as possible by the use of white shellac for filling and the whitest ivory varnish to be found. Most all manufacturers of varnish make an article from carefully selected gums that is intended for such a use. It goes without the saying as it is a matter of course that hard maple takes on the finest polish of any kind of the woods.

Poplar—is a very useful wood for a cheap finish. It works easily—nearly as easily as white pine—and can be used for many purposes of finishing in the place of it. It has little beauty of its own, and consequently can be borrowed to parade under some other name and as a substitute for a higher-priced wood. It is a good wood to imitate others with. Its marking are but few and unobstrusive and not offensive to good taste. This is all that can be said for it. Treat it the same as indicated for white pine which it very much resembles, except that being a hardwood, stains take better upon it than upon pine.

Pine. (Yellow)—This is a very resinous wood that has characteristic markings that are prominent and loud. It partakes somewhat of the makeup of one of the "parvenus" of Wall street parading the street with a pair of big checked pants, and who don't mind stepping on somebody's corns if somebody does not get out of their way. It has a self-important air, acquired by a 2% per month income, and "bon garcon" as it appears is nevertheless a gaudy affair. It is useful nevertheless for a multitude of purposes, but among the most prominent of which is that of ceilings, partition walls and floors and an occasional wainscot, chiefly because it is cheap and suits the taste of many people who want their money's worth of veining in the wood they buy. Being so resinous it should receive one coat of orange shellac for a filler and then one or more coats of varnish on top of that. It takes a fair polish.

Rosewood—Is an almost obsolete wood now and ninety-nine out of every hundred articles made that are sold under the name are imitations. The genuine wood is a bit coarser grained than mahogany and consequently requires more care in filling it, otherwise the same treatment is required for it as for mahogany. It has a pleasant, dark color with rather independent, abruptly-terminating veinings that start in some direction with a good intention of getting there, but invariably get lost before they get there. It is closely imitated upon the cheaper woods the veinings being over-grained upon the stain as indicated for mahogany. All imitations should be highly finished to resemble the "genuine" which is capable of the highest finish.

Sycamore or Buttonwood.—This wood is advancing in favor more and more day by day. The time when it was only fit for tobacco boxes is past and many are racking their brains to find out why it was that they have been so long finding out that it was a pretty wood not only in borrowed feathers (stains) but in its own dear little self; for it belongs to the mignonne order. It is hardly sufficiently saucy as to pass for a soubrette, nor so sober as to pass for the governess. It is somewhere between these too. It makes nice panels for bedrooms and the lesser important rooms and is also used in furniture making for many articles. When it is "quarter sawed it is very prettily veined and through chemical changes develops a beautiful pinkish tone when covered over with or-

ange shellac and varnished over with a light varnish and polished, as it is rather a close-grained wood. Paste filler filling is not absolutely required but will not hurt it if properly done. It is susceptible of the highest polish and by any process.

Walnut.—Our stately American black walnut is fast disappearing. This is sad, but it is true. As long as fashion has decreed that light furniture and light finishes for hardwood rooms is in order a person will hardly be so very inconsolable, as for all its beauty walnut is rather sombre-looking to suit many people who are already too much hippoed and given to look on the dark side of things, and who need to be bolstered up with something bright and enlivening to the feelings. Many people cannot help but feel lugubrious when in the presence of black walnut, as they associate the smell and looks with that which permeates the undertaker's parlors across the way.

The Burl walnut is a chap entirely different from the plain article above described, and in its way is a beauty. It is usually sawed from the roots or the crotch walnut. It is also sawed from the forks of two large limbs. These two are the "Jim dandies" of the family, and they revel in luxury of form and color in all sorts of unexpected ways—in all sorts of divagations and in nearly every sort of form. Some specimens are unique, and it is no wonder (all jokes aside) that they now bring almost their weight in go—no, silver before their owners will part with them.

The owner of a lot of timber land not far away sold the walnut stumps on his land (the timber itself having been cut off long before) for twice the money that the land was worth. Europe is bowing at the shrine of American black walnut just now, and with what our own home demand for it is beside, have made this too much of an aristocratic wood for people of small and limited means. The fancy burl and crotch walnut is largely sawed into veneers and in that shape a little of it is made to go around a long ways and serves to give us a reminder of old times when we used to cut them for fence rails and posts because they split so easily. We then cut $100 worth of timber to get 50 cents worth of rails, but we didn't know "it was loaded" then.

Black walnut is rather an open-grained wood, varying very much in different specimens, and needs filling with a paste filler colored to match the wood. It should also receive one good coat of orange shellac, which will suffice for a leveling previous to polishing, of which it will produce the finest.

Black walnut being a dark-colored wood, needs no artificial addition in the shape of stains to make it look better; nor could any addition give it a better appearance than that which it naturally possesses. It is a pity that it is going away and does not see its way clear to grow fast enough to suit our wants. Like all good things, we seldom appreciate them while we have them with us in plenty.

Redwood.—This Pacific slope product of our forest

is coming rapidly forward for various purposes both in furniture manufacturing and house construction. It is of a rather soft texture and is medium close-grained in growth, and needs filling. A good way to produce a fine polish upon this wood is to add burnt sienna to the filler, apply, rub it off in fifteen minutes after the filling has been put on and let it stand forty-eight hours. After, apply two coats of shellac, rubbing each coat with fine sandpaper, then giving it two to four coats of good varnish, let it dry thoroughly and rub with pumice and water and let stand a day; then rub with water and rotten stone, wash and clean off again, giving it a day to dry, and rub with rotten stone and olive oil until dry, and a fine polish results. There is no very prominent veining in redwood, and its dark color prevents it from being stained in imitation of any other, unless it be for ebonising, for which it is fairly well adapted. It is plentiful, but the long haul over thousands of miles of railway makes it come comparitively expensive to use as compared with many other woods. Of course our Western States are by far the greatest users of this wood.

CHAPTER XVIII.

FINISHING FLOORS.

In the main the principles laid down for wood finishing in general apply with equal force to finishing floors. Only very hard woods can be advantageously used in laying floors, and only such are ever finished. It is true that pine floors predominate, but these are usually covered with carpets and are never finished off. White pine is too soft in texture for floors that are laid to walk upon, and where that wood is used, the floors are better painted than left in its own finish. Yellow pine is extensively used in some parts and hard maple or white oak in many others. All the above-named woods make good floors to walk upon, that will stand. Yellow pine should be oiled, but will also make a good finish by being coated with a coat of shellac varnish and two coats of a good, substantial floor varnish. Some firms make a special varnish which they recommend very highly for this purpose.

Shellac is very touchy about damp and wet, so one should be careful to have the varnish that is applied over it cover it well, to prevent the filtering of water upon it. A well laid floor should not have any cracks, but all floors are not well laid, and some do have cracks. In such cases, by all means fill up any openings in the floor to a level. Make a filling of the following composition:

Well soaked unsized paper.....1 part
Silver white..... .....1 part
Strong glue.....1 part

Dissolve the glue in sufficient water to make a paste of the whole, and apply with a wide putty knife. Substitute wood pulp for the paper, if it can be easily procured. After filling up cracks with this composition, proceed to the finishing. It will not discolor the wood.

Oak and maple can be simply oiled and left in that condition. The operation is simple and easy. To either raw or boiled linseed oil add equal quantities of kerosene oil and naptha say from one-third to one-half of the quantity of linseed oil used, and brush over the floor. It requires two coats, at least, and three are better to oil a floor. These should not be applied over each other until all the greasiness of the previous one has disappeared.

All kinds of wood (except white pine) used in floor-making can be advantageously treated to a "wax finish" as described in a previous chapter. If shellac with two coats of varnish is to be the finishing, make sure that you are using a good grade of varnish—one that you know something about—and there need be no trouble.

THE END.

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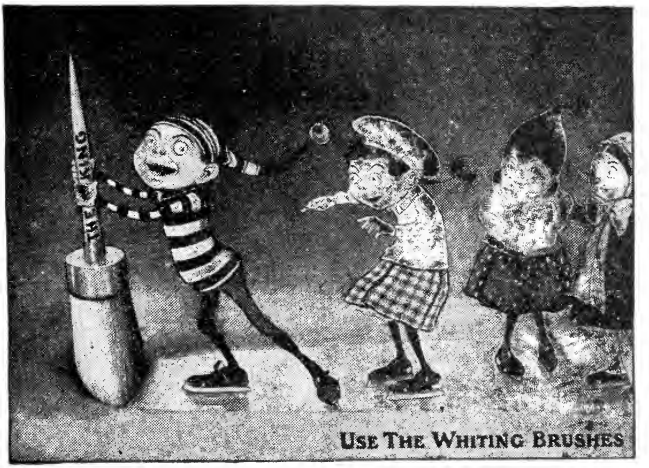

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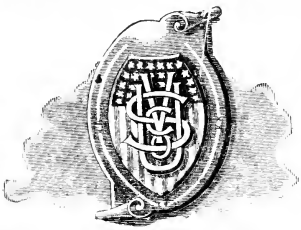

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